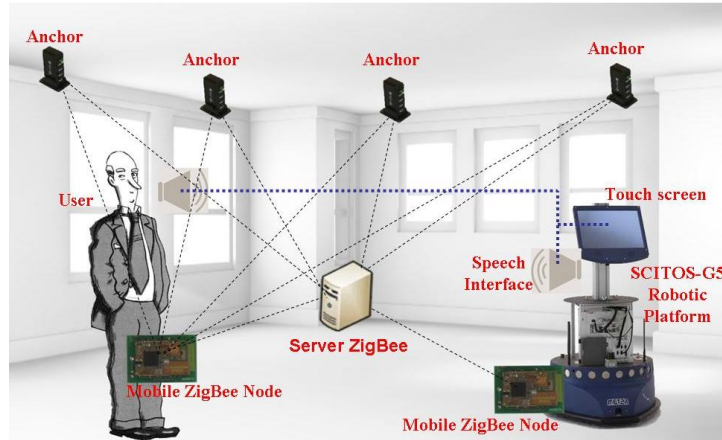


Delivery Astromobile Final

Simon listens

PIC: 987058033
 Grant Agree number: 231143
 Project: ASTROMOBILE



In relation to the

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Task 3: Human-Robot Multimodal Interfaces Development [month 1 - month 12]		
Participant	Role	Person-months
SL	Leader	14
Objectives: Development of a visual/touch interface (touch screen) Development of a natural language interface (speech recognition)		
Task 4: Integration and Final Experimentation [month 9 - month 18]		
Participant	Role	Person-months
SSSA	Leader	20
SL	Partner	7
Objectives: Integration and assembling of parts from the previous three tasks. Revisiting of results from previous tasks, also according to milestone. Development of additional functionalities. Experimentation.		

Content

1.	Introduction	5
2.	Signal processing	5
2.1.	Microphone solutions	5
	Using a wireless microphone system (direct communication)	5
	Using a simon client for mobile devices	5
	Using installed microphone network in the environment	6
2.2.	Zones of signal processing:	6
	Call zone	6
	Communication zone	6
	Comfort zone	6
2.3.	Microphone tests	6
	Description:	6
	Environment	7
	Test objects	7
	Objectives:	9
	Method:	10
	Results:	10
	Excluded Microphones:	11
	Usable Microphones for speech recognition:	11
	Selected microphones for the ASTROMOBILE project	12
3.	Speech modelling	13
3.1.	Preparation of the technical infrastructure	13
3.2.	Investigation of speech models	13
	German	13
	Italian	14
	English	14
3.3.	Speech model design	14
	Parameter definition	14
	Speech recordings	15
	Model compilation	15
3.4.	Recording Italian speech data	15
4.	Development of dialogues	16
4.1.	Dialogue screenshots	17
	Dialogue: To get up	17
	Dialogue: Breakfast	17

Dialogue: Reminderfunction „drinking“	18
Dialogue: Reminderfunction „Drugs“	19
Dialogue: Reminderfunction „coffee break“	19
Dialogue: Reminderfunction „lunch and dinner“	20
Dialogue: Reminderfunction „activities“	21
Dialogue: Reminderfunction „Skypecalls“	21
Dialogue: Reminderfunction „to go to sleep“	23
4.2. Dialogue specifications	24
Dialogue specifications in German	24
Dialogue Specifications in English	38
Dialogue specifications in Italian.....	48
5. Development of scenarios	62
5.1. Framework for speech commands and touch control:.....	62
5.2. Detailed definition of the scenarios.....	64
5.3. Adaption of the framework to the defined scenarios in the last work session	66
Beginning of the detailed definition of the scenarios to make a checklist of the different technical aspects of the different groups of scenarios from the point of technical view	67
New command structure	67
6. Programming.....	68
6.1. Programming the D-Bus interface between simon and the robot platform.....	68
Drafting Architecture of AstroMobile.....	68
Moving the Robot Platform to Ubuntu 10.10.....	69
Setting Up the Principal Architecture based on D-Bus.....	70
Creating English Demonstration.....	70
Deciding on Source Control and Licenses	70
6.2. Simon - ASTROMOBILE – new developments	71
Simontouch Development	71
Multi-microphone architecture.....	74
speechcal	75
simonoid	75
afaras	75
simonskype	76
simonstatus.....	76
6.3. The dialogue system of simon	76
States	76
Avatar	76
Options	77
Bonded values.....	77
Static	77

QtScript	77
Output options	77
Dialogues in the Astromobile project	77
6.4. Simone – smart phone client	83
simone for MeeGo	84
simond Modifications	90
6.5. Usability Information	91
Users on Astro	91
Web Interface	91
Adding appointments or commands	99
7. Conclusions	103
8. Attachments	105
8.1. SIMON Microphone preselection	105
8.2. Analysis of microphones for speech recognition from distances	110
8.3. Recorded Italian wordlist	113
8.4. Simontouch Voice Commands	119
8.5. Protocol Work Session	121
User - Robot:	122
Robot - User:	123
Caregiver – robot - user	124
Function requirements	125
8.6. Protocol End-User Tests	128

1. Introduction

To fulfil the mentioned task within the project ASTROMOBILE we have to work on the following different sub-tasks with many requirements of different scientific requirements and not only technical issues like:

- Signal processing
- Speech modelling
- Development of dialogues
- Development of scenarios and
- Programming

2. Signal processing

2.1. Microphone solutions

Three ways to a solution:

Using a wireless microphone system (direct communication)

The customer wears a wireless microphone system and just has to call the robot, no matter in which room he stays. This seems to be the easiest solution but there are many inconvenient problems in the practical use. The user has to carry the equipment with him (microphone, wireless unit, batteries, etc.)

Using a simon client for mobile devices

The customer uses a mobile device like a mobile phone with installed simon client connected to the local network. Currently there is no plan to develop a simon client in this project but maybe a simon client will be available for android mobile phones within the next six months as a result of another project. Maybe it could be good to use the mobile phone for a defined call zone and change the quality of communication between user and robot in the moment that the robot stays in front of the user using a high quality gooseneck microphone.

Requirements:

- simon client for mobile devices
- Adaption of simon to handle different microphones and activate them on demand
- Adaption of simon to handle different acoustic models for different zones of signal processing (e.g. comfort zone, call zone, communication zone)

Using installed microphone network in the environment

An installed microphone network is used to recognize commands to call the robot. It can be hidden in every room. This network is just used to call the robot. In front of him a simple gooseneck microphone is used to command all predefined tasks.

Requirements:

- Installation of a microphone-system in the environment
- Adaption of simon to handle different microphones and activate them on demand
- Adaption of simon to handle different acoustic models for different zones of signal processing (e.g. comfort zone, call zone, communication zone)
- Integration of a garbage model and voice activity detection
- A solution of sound segmentation would be good but the implementation would exceed the project time. Maybe there are some synergies with the results of other echord projects.

2.2. Zones of signal processing:

Call zone

Calling the robot, calling for help, security signals from everywhere in the environment

Communication zone

Be able to make a phone call (distance of 1 to 3 meters from a gooseneck microphone)

Comfort zone

High quality of communication between user and robot, command and control, dialog control, etc. (directly in front of a microphone)

2.3. Microphone tests

Description:

In the following tests we were using preselected microphones from the Institute of signal processing and speech communication of the Graz University of Technology! (The test of preselection you can find under attachment 8.1)

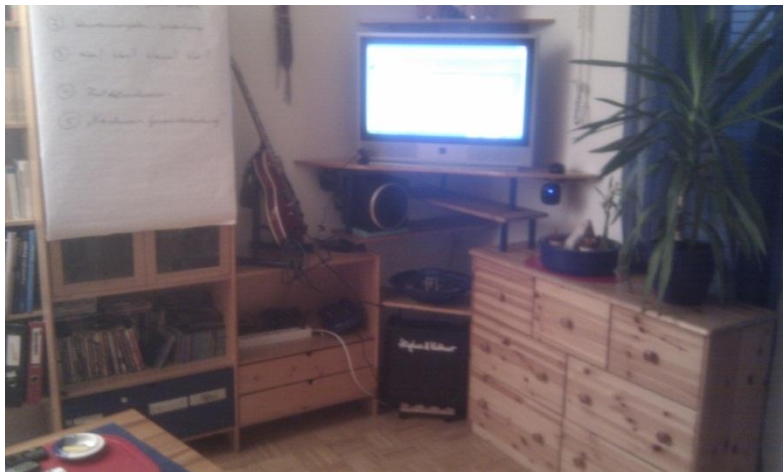
in a natural environment. We used simon 0.3 stable release and a precompiled general model (bp_rr_huh_hug_hus_ada_adc_add_shh_shg_shs_2010_09_09) without samples of the test speaker. We used a selected list of words for recognition. This list contained 20 selected words out of 99 simon recognized perfectly.

Construction of the testset:

Using the Sennheiser PC 36 USB Headset the test person spoke 5 times the 99 words and documented the recognition rate. The selected 20 words always had a recognition rate of 100%.

Environment

We have tested the microphones in a controlled environment under possible end-user conditions. The environment was a normal flat with standard furniture like mediacenter, tv, kitchen, couch, etc.



Test objects

- **THE T.BONE TB312S gooseneck microphone**

the t.bone TB312S dynamic gooseneck microphone - on/off switch, 3 pin XLR connector, ideal for talkback or installations, gooseneck length 27cm

- **Sony ECM-MS907**

Battery Life	:	Approx.	100	hours	with	Sony	AA	Battery
Cord Length	:					5'		(1.5m)
Directivity	:	Uni-Directional (stereo);	Directive	angle	90	or	120°	(switchable)
Dynamic Range	:		More	than				80dB
Effective Output Level	:	-56	dBm	±4dB	(0dB=1mW/Pa,			1kHz)
Frequency Response	:			100	-			15,000Hz
Maximum sound pressure level input	:			more	than			110dB SPL

Output Impedance : 1 kohms ±20%, unbalanced
 Power Requirements : DC 1.5V from Manganese Battery (x1)
 Type : Mid-Side Stereo; Electret Condenser Microphone

- **Sony ECM-CZ10**

Cord Length (Approx.) : 1.0m; Diameter: 1.5mm
 Dimensions (Approx.) : 32 x 60 x 110mm (Phase-Tube System), 8 x 19 mm (MIC)
 Weight (Approx.) : MIC: 10g (with Body, Cord)
 Directivity : Zoom (Sensitive); Mono (Uni-directional)
 Material : Of Plug: Mini 3.5, Gold plated, L-shaped
 Plug : Monaural mini plug
 Operating Temperature : 32 degrees F - 104 degrees F (0 degrees C - 40 degrees C)
 Frequency Response : 100 - 10,000Hz
 Noise Level : Ander 39.0dB S.P.L.
 Sensitivity (db) : -33 + -4dB (Open circuit output voltage level)
 Sound System : 3% wave distortion at 1,000Hz

- **SAMSON CM12C hanging microphone**

SAMSON CM12C black, condenser hanging microphone, cardioid, steel Hanging positioning bracket, incl. 10 meter XLR-cable, incl. windscreen, 9-52 Volt phantom, especially for choir

- **Sennheiser PC 36 USB Headset**

Cable length 3 m / 9.8 ft
 Connector USB connector with integrated sound card 2 x 3.5 mm for PC/Laptop
 Frequency range 40 – 18,000 Hz
 Impedance 32 Ω
 Characteristic SPL 109 dB
 Frequency range 80 – 15,000 Hz
 Pick-up pattern Noise-canceling
 Impedance ~2 kΩ
 Sensitivity as per 121 TR 9-5 -38 dBV/Pa

- **Samson UB1**

Plug-and-play operation on Mac OS and Windows
 16-Bit, 44.1-48kHz sample rates
 Miniature, low-profile design
 Omni-directional pickup pattern
 10-foot USB cable included

Ideal for recording meetings, conferences or creating podcasts
Sleek black finish

- **Acoustic Magic**

Range: 30+ feet for meeting recording (depends on acoustic characteristics of the room.)
Analog Output: (6ft male/male audio cable included), Mic level, 3.5mm ministereero jack, Same signal on tip & ring, 500 ohm output impedance
Frequency Response: 100Hz to 11,250 Hz
Physical Dimensions: Length: 18", Height: 2.5", Weight: 2.5lbs
Power Equipment: (wall-powered converter included) 6V DC, 400 ma, Center Pin Positive

- **Samson Q1U**

Plug in and start recording. No extra gear needed!
Everything you need for recording audio on a computer
16-Bit resolution, 44.1-48kHz sampling
High SPL neodymium element
Supercardioid pickup pattern
Smooth, flat frequency response
Includes desktop mic stand, mic clip, USB cable and carry pouch

- **THE T.BONE wireless microphone system with LC97 TWS microphone**

THE T.BONE TWS 16PT 854MHZ
the t.bone TWS 16PT 854MHz, 16 channel UHF wireless-system - 9,5" diversity receiver, bodypack (line/mic switchable) with 3-pole mini XLR connector (AKG compatible), 16 switchable frequencies (854.375MHz-861.875MHz), up to 4 parallel systems, switchable squelch, XLR and jack output, external power supply (DC 12V/500mA), DC out for recharging transmitter. Accessories included: 19" rack mounts (for rack mounting two TW16 units), 1m jack output cable, DC recharging cable & 1m guitar cable. Transmitter takes two 1.5 V AA batteries. This wireless system is only licensed for use in Germany - please enquire about countries/frequencies.

THE T.BONE LC97 TWS
the t.bone LC97 TWS lavalier cardioid microphone - AKG compatible mini XLR connector. Includes windscreen.

Objectives:

The main objectives of these tests were to develop a feeling which microphone would be the favorite one to use in different zones of communication. Therefore we made tests from different distances (30 cm, 100 cm, 300 cm, 400 cm, 500cm and < 10cm) and different angles (0°, 45° and 90°)

Method:

The test person spoke the preselected 20 words five times and documented the recognition rate. The average of this recognition rate was the final result of the microphone in the specified distance and angle.

Results:

Microphone	Average recognition rate						
	Total Average						
Distances:	0cm	30cm	100cm	200cm	300cm	400cm	500cm
THE T.BONE TB312S gooseneck microphone 0°		81,53%	88,63%		75,54%		
THE T.BONE TB312S gooseneck microphone 45°					88,53%	87,70%	85,25%
THE T.BONE TB312S gooseneck microphone 90°					91,61%	86,58%	85,51%
Sony ECM-MS907							
Sony ECM-CZ10	95,40%	90,75%	86,49%				
SAMSON CM12C hanging microphone		80,00%	79,60%				
Sennheiser PC 36 USB Headset	100,00%						
Samson UB1		93,75%	87,85%				
Acoustic Magic							
Samson Q1U 0°		99,75%	93,14%				
Samson Q1U 45°		97,10%	89,05%				
Samson Q1U 90°		98,62%	83,17%				

THE T.BONE wireless microphone system							
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2.3.1.1. Sony ECM-MS907

This microphone had serious problem with speech recognition an

2.3.1.2. Acoustic Magic

The Acoustic Magic Array Microphones are an American product. This means different voltage and we had no possibility to test it.

2.3.1.3. The T-BONE wireless microphone system with The T-BONE LC97 TWS Microphone

In this case we used different tests. Due to the fact, that this is a wireless microphone set where the microphone is pinned on the shirt we didn't did not test different distances but we tested different ranges focused on different numbers of walls between sender and receiver.

Microphone	Average recognition rate						
	Total Average						
	No wall	1 wall	2 walls	3 Walls			
THE T.BONE wireless microphone system	100,00%	100,00%	100,00%	100,00%			

Excluded Microphones:

Sony ECM-MS907

Acoustic Magic

Usable Microphones for speech recognition:

Detailed results you can find under attachment 8.2

Microphone	Zones of signal processing		
	Comfort zone	Communication Zone	Call Zone
THE T.BONE TB312S gooseneck microphone 0°	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Sony ECM-CZ10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
SAMSON CM12C hanging microphone	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Sennheiser PC 36 USB Headset	<input checked="" type="checkbox"/>		
Samson UB1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Samson Q1U	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
THE T.BONE wireless microphone system	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Selected microphones for the ASTROMOBILE project

2.3.1.4. 1st solution: Wireless Microphone

THE T.BONE wireless microphone system is a possible solution to fulfill the convened task within the ASTROMOBILE project, but in the reality the task group of elder people would not use a wireless headset to control a robot. So it's necessary to think about practical solutions, which could be the following considerations

2.3.1.5. 2nd solution: Smart phones

A Mobile Device with MeeGo or Android 2.2 and usable client and THE T.BONE TB312S gooseneck microphone in combination could be a useful solution. So it could be possible to call the robot with the smart phone, and when he stays in front of the User to follow to work with the installed high quality gooseneck microphone.

2.3.1.6. 3rd solution: Microphone installation

THE T.BONE TB312S gooseneck microphone

SAMSON CM12C hanging microphones

Different SAMSON CM12C hanging microphones with comparable quality to the gooseneck microphone installed in the environment and one gooseneck microphone on the robotic platform could be a very useful solution, because the User needs nothing only the voice to call the robot, and when he stays in front of him he can control the robot with the high quality gooseneck microphone.

3. Speech modelling

3.1. Preparation of the technical infrastructure

In the first step we prepared the technical infrastructure to be able to construct the German, Italian and English speech models for this project. We installed a speech data server to collect speech data from Italy and implemented a High Power Compilation-PC to create speech models. The scientific software like SSC (Simon speech collector) and SAM (Simon acoustic modeler) is ready to use. The German speech model is ready to use.

3.2. Investigation of speech models

German

3.2.1.1. Available German speech models

- German Voxforge Speech model
- Different speech models from simon listens, adapted to the target group from speakers in different age ranges and for different microphone types (e.g. gooseneck microphone, hanging microphone, headset). In the last recordings for our speech model database we included also necessary word for the astromobile project (“astro”, etc.)

3.2.1.2. Available German dictionaries

- HADI-Bomp from the University of Bonn (ca. 140.000 Words)
- Extended Hadi-Bomp from the University of Bonn extended from simon listens to match Austrian german (ca. 140.000 Words)
- German Voxforge Lexicon
- Ralf Herzog German Dictionary

Italian

3.2.1.3. Available Italian speech models

Until now we have no Italian speech model available

3.2.1.4. Available Italian dictionaries

- Ralfs Italian Dictionary (ca. 92.000 words)

English

3.2.1.5. Available English speech models

- English VoxForge speech model

3.2.1.6. Available English dictionaries

- CMU English Lexicon (ca. 130.000 words)
- ISIP Lexicon (ca. 27.500 words)
- VoxForge Dictionary (ca. 131.000 words)
-

3.3. Speechmodeldesign

The creation of a speech model consists of three parts:

- Parameter definition
- Speech recordings
- Model compilation

Parameter definition

In this part we will have to define different parameters which will affect the speech model. This includes following definitions:

- Wordlist: We have to define which words should be recorded for the speech model to cover our scenarios

- **Hardware:** Which hardware is necessary for recordings, this includes Computers, Microphones, Soundcards, etc.
- **Software:** With which software should the recording process be done? There are many possibilities like standard recording software like Audacity or special speech recording solutions like SSC from the simon speech recognition suite. In our case we will probably use SSC, because it covers all of our needed functionalities.
- **People to record:** We have to clearly define with whom we record your audio samples. There are many aspects we should consider to cover your target group like appropriate age range, balanced ratio of male and female speakers, enough speakers to obtain enough different data etc.
- **Setting:** We clearly have to define which settings should be used. They are for example where the recordings should happen, under which circumstances etc. Therefore we have to keep in mind, that the recordings should be as near as possible to our scenarios.

Speech recordings

The second part is the speech recording. In this case we have to consider the conditions defined in part one. We should also keep in mind that the recordings should be as near as possible to the scenario the speech model is made for.

Model compilation

The third part is the compilation of the speech data to a speech model. Therefore we will use SAM from our software suite simon. In this case we will have to make different tests in every language we will record to achieve the best recognition results.

3.4. Recording Italian speech data

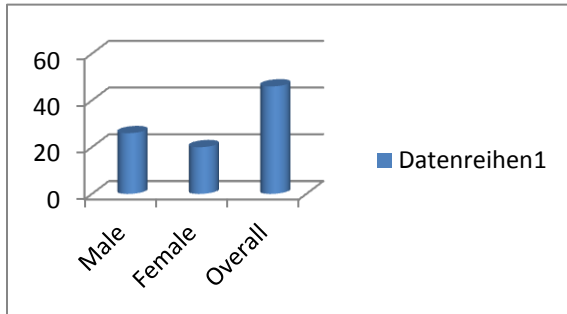
In this case we installed a work process to approve the proposed word list and adapt it to the special requirements of the ASTROMOBILE project and the cultural area of Pisa. So we changed the word list from 111 words to 145 words.



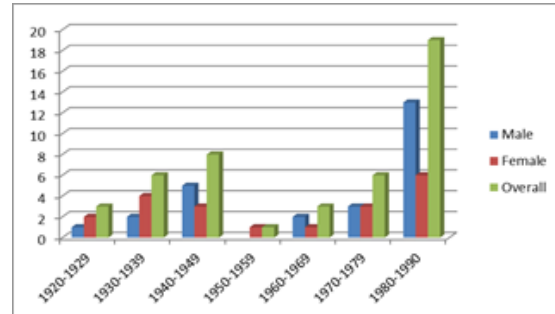
With the great dedication of our partners it was possible to record speech data from 46 persons (11 persons older than 65 years) in these three days. With this Italian speech data we can construct an Italian speech model for the special needs of this project.

The distribution of the characteristics of the speech data are the following:

Gender



Age



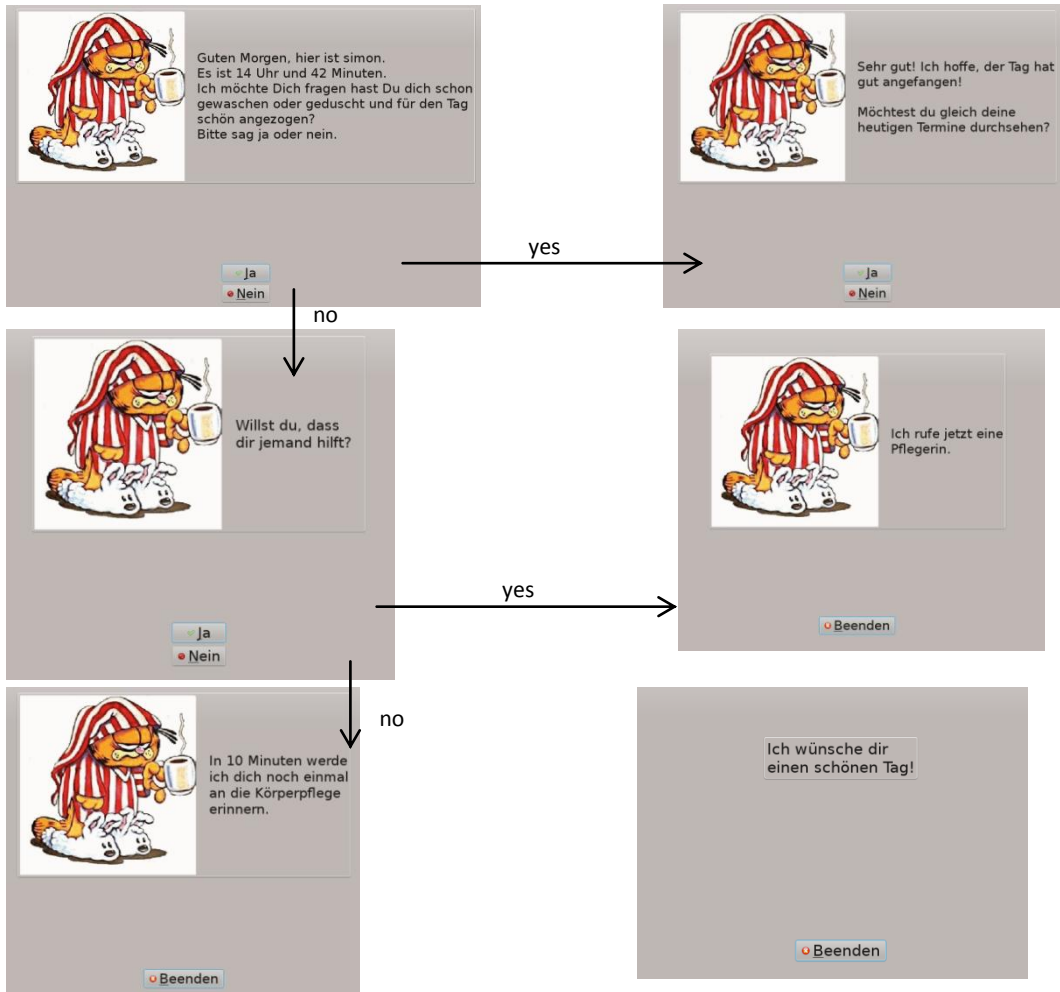
The detailed Italian wordlist you can find under attachment 8.3

4. Development of dialogues

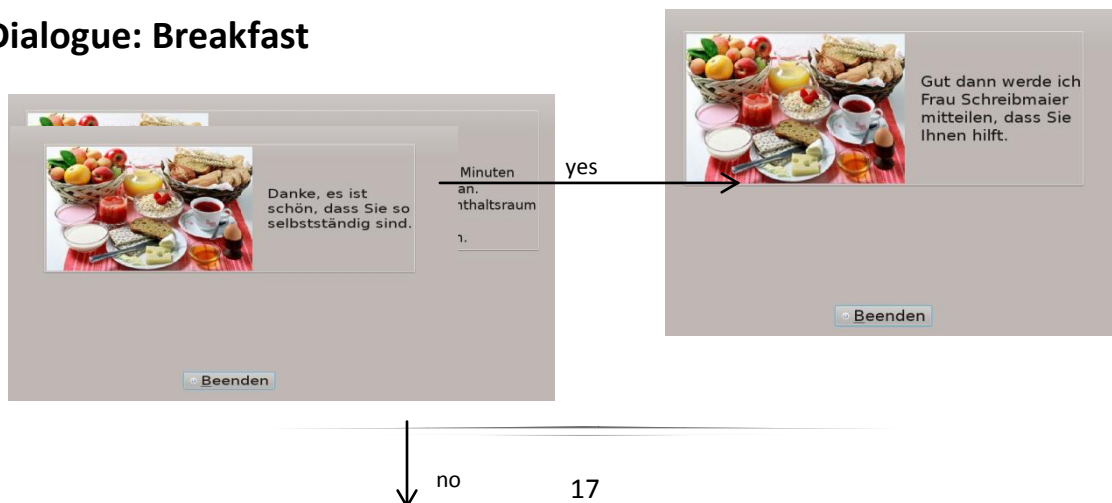
We invested a great part of the manpower in the development of a prototype of a scheduler based dialog control system with graphical, written and voice output. For testing we developed German dialogues and reminder functions for the scenarios drinking, eating, social services, medication, reminder of events and a Skype dialogue. The control of the dialogues and reminder functions is based on a scheduler. In the practical use it's necessary that the caregiver appoints the reminder function in the scheduler, and when the time comes the robot goes to the User to execute the reminder function.

4.1. Dialogue screenshots

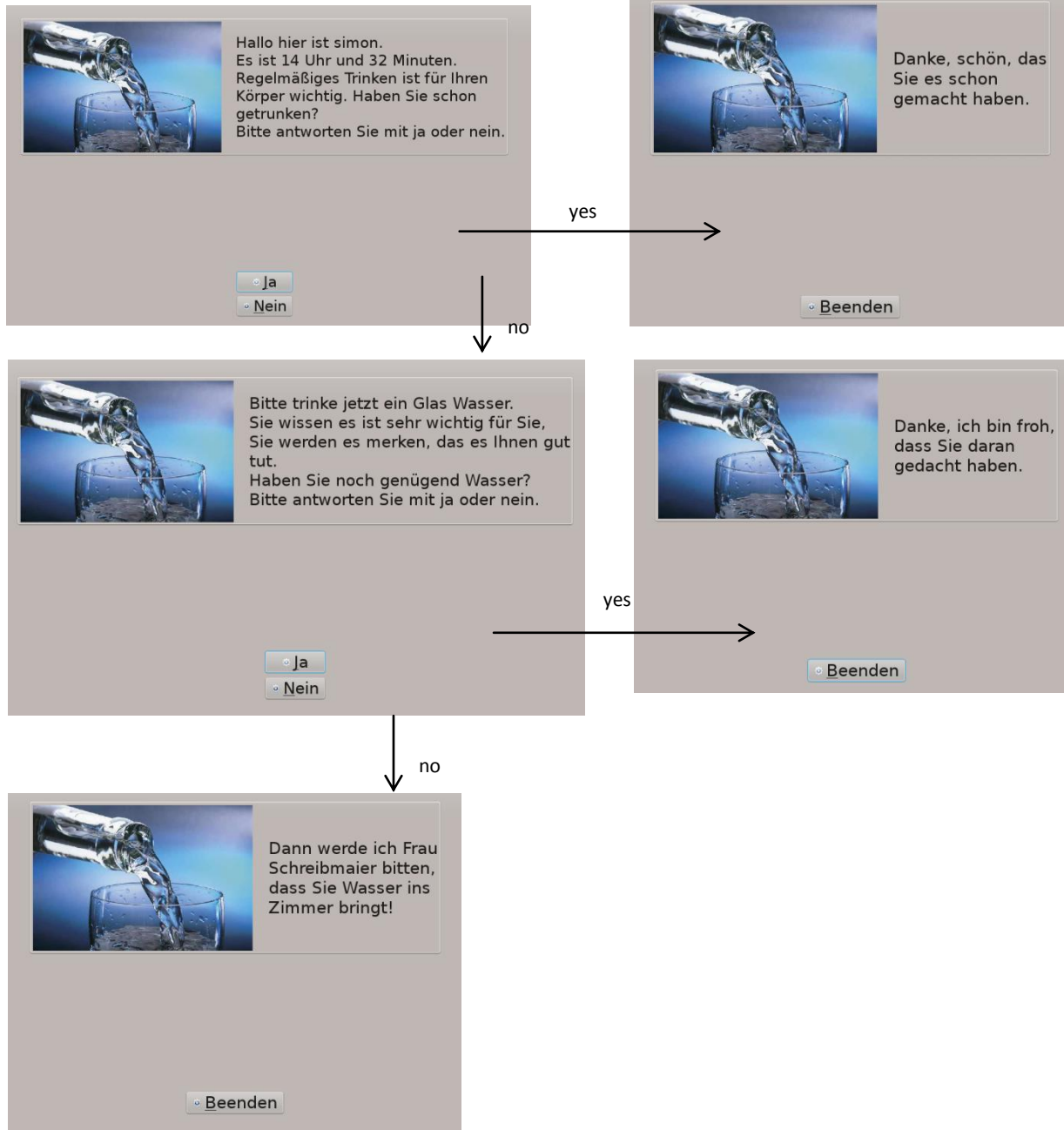
Dialogue: To get up



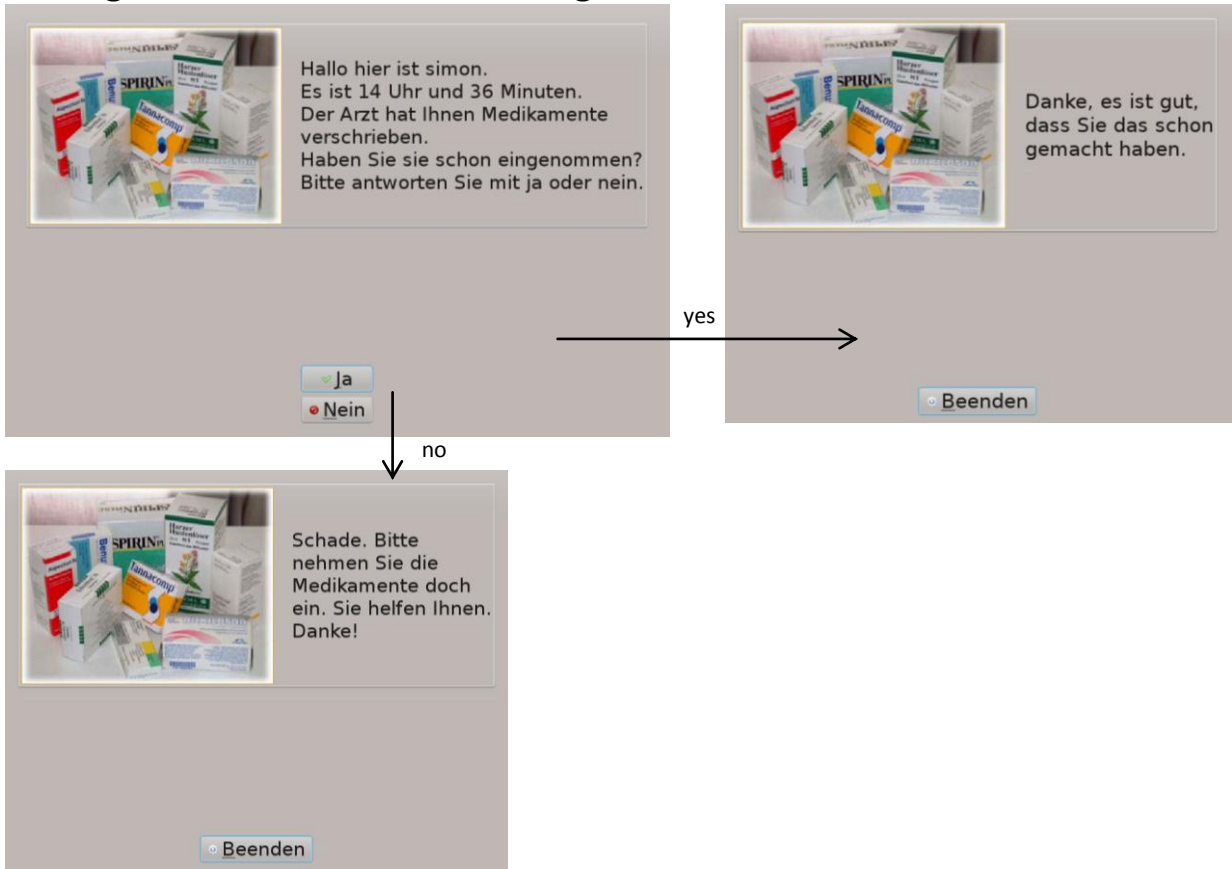
Dialogue: Breakfast



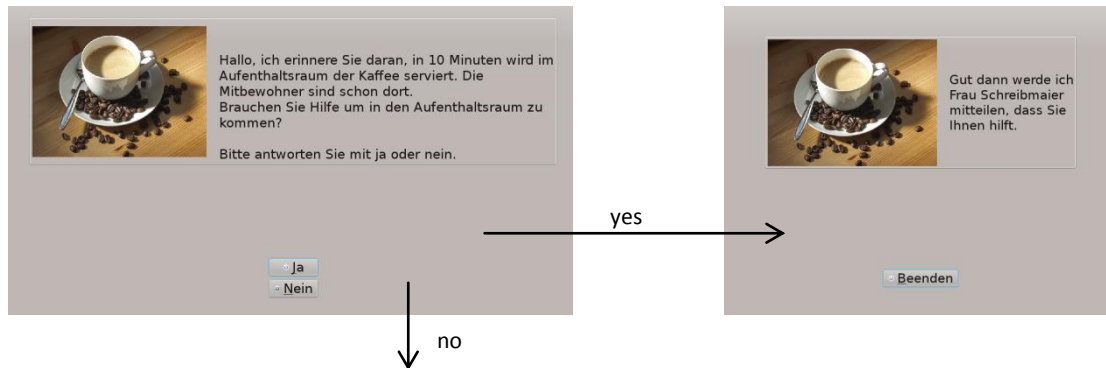
Dialogue: Reminderfunktion „drinking“



Dialogue: Reminderfunction „Drugs“

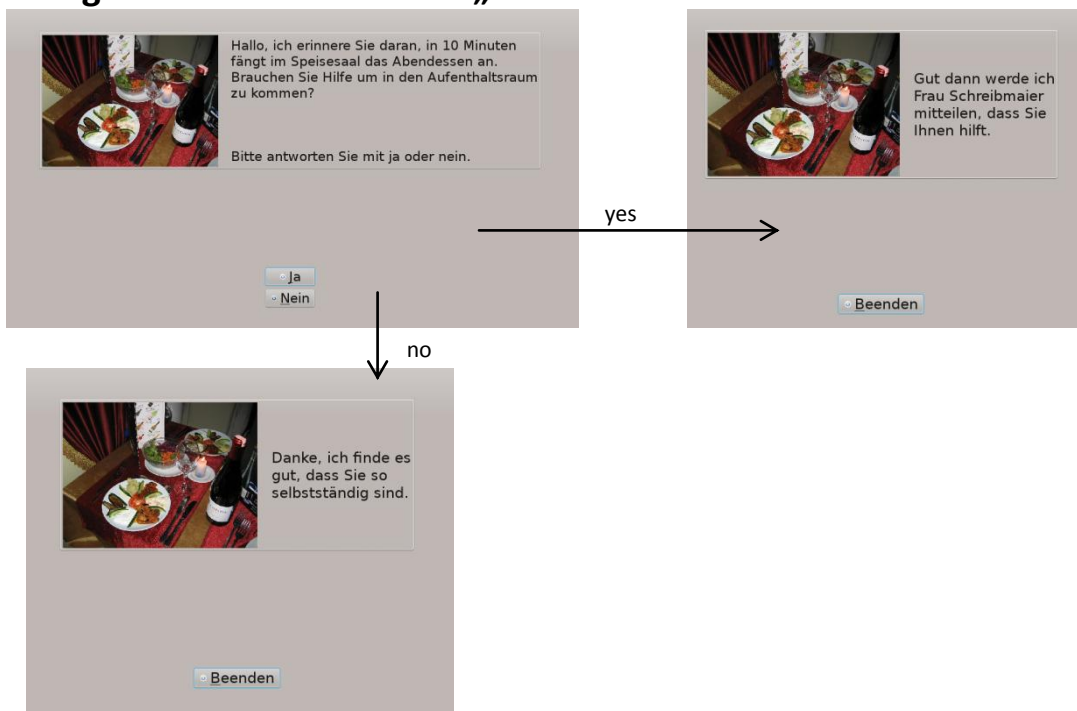


Dialogue: Reminderfunction „coffee break“






Dialogue: Reminderfunktion „lunch and dinner“




Dialogue: Reminderfunction „activities“



Hallo hier ist simon.
Es ist 14 Uhr und 31 Minuten.
Ich möchte Sie daran erinnern dass in
15 Minuten das Gedächtnstraining in
Raum 12 beginnt. Frau Schreibmeier
freut sich schon auf Ihren Besuch!

Beenden


Dialogue: Reminderfunction „Skypecalls“



Hallo hier ist simon.
Es ist 14 Uhr und 34 Minuten.
Stieger Franz wartet wie immer am
Donnerstag auf Ihren Anruf!
Soll ich jetzt für Sie wählen?
Bitte antworten Sie mit ja oder nein.

ja
nein


yes



Gut dann rufe ich
jetzt Stieger Franz
an. Bitte haben Sie
ein wenig Geduld.

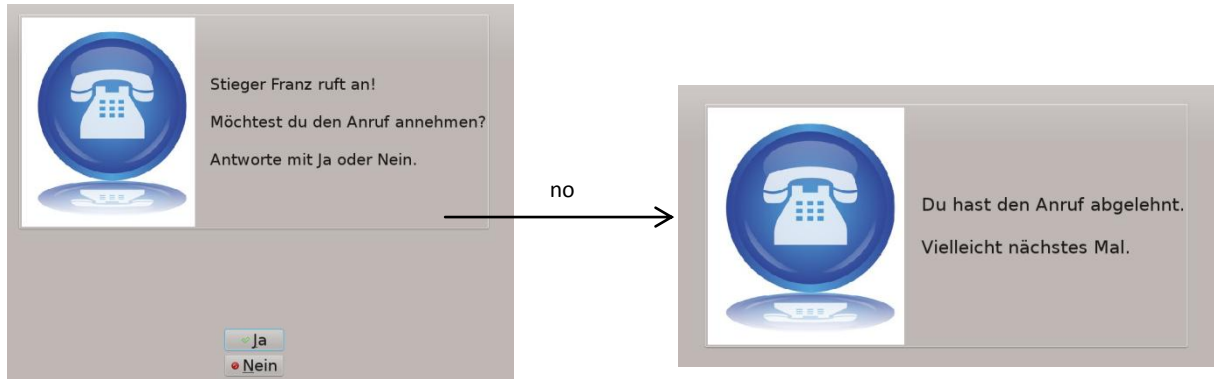
Wird angerufen...

no

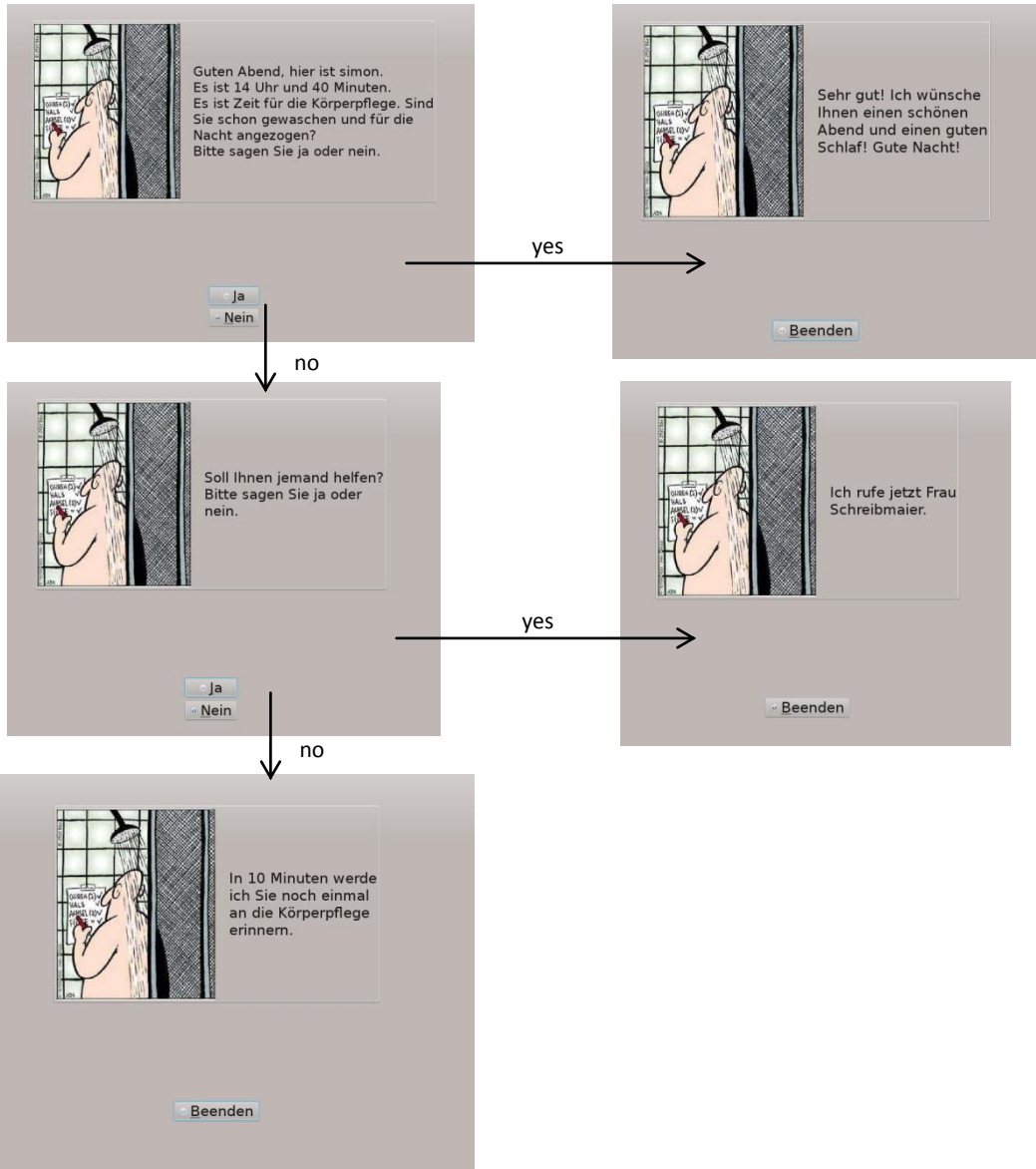


Ich verstehe.
Sie wollen heute nicht mit
Ihm sprechen. Ich werde es
Ihm gleich sagen.

Beenden



Dialogue: Reminderfunction „to go to sleep“



4.2. Dialogue specifications

Dialogue specifications in German

4.2.1.1. Erinnerungsfunktionen mit Bestätigungsanforderungen

Legende:

Turn: Dialogzyklus

DP: Dialogpartner

User: Spracheingabe

Sys: Systeminformation (Namen, Uhrzeit, Formal = „Sie“-Form, elseformal = „Du“-Form, \$Beispiel\$ = anpassbare Variable)

Syn – Sprachsynthese

4.2.1.1.1. Aufstehen-Dialog – Weckfunktion – Körperhygiene und Ankleiden morgens

Turn	DP	Text
1	Sys	<p>Zufallsvariable Version 1: Guten Morgen, hier ist \$astro\$. Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}dich{{endformal}} fragen, {{formal}}haben Sie sich{{elseformal}}hast du dich{{endformal}} schon gewaschen bzw. geduscht? Bitte {{formal}}sagen Sie{{elseformal}}sag{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 2: Guten Morgen, hier ist \$astro\$. Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}Dich{{endformal}} fragen {{formal}}haben Sie sich{{elseformal}}hast Du dich{{endformal}} schon gewaschen oder geduscht und für den Tag schön angezogen? Bitte {{formal}}sagen Sie{{elseformal}}sag{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 3: Guten Morgen, hier ist \$astro\$. Es ist \$time\$. Ich frage {{formal}}Sie{{elseformal}}dich{{endformal}}, {{formal}}haben Sie sich{{elseformal}}hast du dich{{endformal}} schon angezogen?</p>

		<p>Bitte {{formal}}sagen Sie{{elseformal}}sage{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 4: Guten Morgen, hier ist \$astro\$. Es ist \$time\$. {{formal}}Haben Sie sich{{elseformal}}Hast du dich{{endformal}} heute schon gewaschen oder geduscht? Und {{formal}}sind Sie{{elseformal}}bist du{{endformal}} schon angezogen? Bitte {{formal}}sagen Sie{{elseformal}}sage{{endformal}} JA oder NEIN.</p>	
	User	Ja	Nein
2	Sys	<p>Zufallsvariable Version 1: Das freut mich. {{formal}}Möchten Sie{{elseformal}}Möchtest du{{endformal}} gleich{{formal}}Ihre{{elseformal}}deine{{endformal}} heutigen Termine durchsehen? Bitte {{formal}}sagen Sie{{elseformal}}sag{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 2: Das freut mich! {{formal}}Sie schauen{{elseformal}}Du schaust{{endformal}} heute besonders nett aus! {{formal}}Möchten Sie{{elseformal}}Möchtest du{{endformal}} gleich {{formal}}Ihre{{elseformal}}deine{{endformal}} heutigen Termine durchsehen? Bitte {{formal}}sagen Sie{{elseformal}}sag{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 3: Das ist gut! Ich bin sicher, {{formal}}Sie schauen{{elseformal}}du schaust{{endformal}} heute sehr nett aus! {{formal}}Möchten Sie{{elseformal}}Möchtest du{{endformal}} gleich {{formal}}Ihre{{elseformal}}deine{{endformal}} heutigen Termine durchsehen? Bitte {{formal}}sagen Sie{{elseformal}}sag{{endformal}} JA oder</p>	<p>Zufallsvariable Version 4: Soll {{formal}}Ihnen{{elseformal}}dir{{endformal}} jemand helfen? Bitte {{formal}}sagen Sie{{elseformal}}sag{{endformal}} JA oder NEIN!</p> <p>Zufallsvariable Version 4: {{formal}}Möchten Sie{{elseformal}}Möchtest du{{endformal}} Hilfe? Bitte {{formal}}sagen Sie{{elseformal}}sag{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 4: {{formal}}Wollen Sie{{elseformal}}Willst du{{endformal}}, dass {{formal}}Ihnen{{elseformal}}dir{{endformal}} jemand hilft? Bitte {{formal}}sagen Sie{{elseformal}}sag{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 4: {{formal}}Möchten Sie{{elseformal}}Möchtest du{{endformal}} Hilfe? Bitte {{formal}}sagen Sie{{elseformal}}sag{{endformal}} JA oder NEIN.</p>

		<p>NEIN.</p> <p>Zufallsvariable Version 4: Sehr gut! Ich hoffe, der Tag hat gut angefangen! {{formal}}Möchten Sie{{elseformal}}Möchtest du{{endformal}} gleich {{formal}}Ihre{{elseformal}}deine{{endformal}} heutigen Termine durchsehen? Bitte {{formal}}sagen Sie{{elseformal}}sag{{endformal}} JA oder NEIN.</p>		
	User		Ja	Nein
3	Sys		<p>Ich rufe jetzt eine \$Pflegerin \$</p>	<p>Zufallsvariable Version 1: Ich werde {{formal}}Sie{{elseformal}}dich{{endformal}} in 10 Minuten wieder an die Körperpflege erinnern.</p> <p>Zufallsvariable Version 2: In 10 Minuten werde ich {{formal}}Sie{{elseformal}}dich{{endformal}} noch einmal an die Körperpflege erinnern.</p> <p>Zufallsvariable Version 3: Die Körperpflege ist wichtig! In 10 Minuten erinnere ich {{formal}}Sie{{elseformal}}dich{{endformal}} daran noch einmal.</p>

4.2.1.1.2. Körperhygiene und auskleiden abends

Tur n	DP	Text
1	Sys	<p>Zufallsvariable Version 1: Guten Abend, hier ist \$astro\$. Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}dich{{endformal}} fragen, {{formal}}haben Sie sich{{elseformal}}hast du dich{{endformal}} schon gewaschen, die Zähne geputzt und für das Schlafen umgezogen? Bitte {{formal}}sagen Sie{{elseformal}}sage{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 2: Guten Abend, hier ist \$astro\$. Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}dich{{endformal}} an Körperpflege erinnern! {{formal}}Haben Sie sich{{elseformal}}Hast du dir{{endformal}} die Zähne geputzt? {{formal}}Haben Sie sich{{elseformal}}Hast du dich{{endformal}} gewaschen? {{formal}}Sind Sie{{elseformal}}Bist du{{endformal}} schon für das Schlafen umgezogen? Bitte {{formal}}sagen Sie{{elseformal}}sage{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 3: Guten Abend, hier ist \$astro\$. Es ist \$time\$. Es ist Zeit für die Körperpflege. {{formal}}Sind Sie{{elseformal}}Bist du{{endformal}} schon gewaschen und für die Nacht angezogen? Bitte {{formal}}sagen Sie{{elseformal}}sage{{endformal}} JA oder NEIN.</p>
	User	<p>Ja</p> <p>Zufallsvariable Version 1: Das freut mich! Ich wünsche {{formal}}Ihnen{{elseformal}}dir{{endformal}} einen gemütlichen Abend und einen erholsamen Schlaf. Bis morgen.</p> <p>Zufallsvariable Version 2: Sehr gut! Ich wünsche {{formal}}Ihnen{{elseformal}}dir{{endformal}} einen schönen Abend und einen guten Schlaf! Gute Nacht!</p> <p>Zufallsvariable Version 3: Das freut mich sehr! Einen</p>
		<p>Nein</p> <p>Zufallsvariable Version 1: Soll {{formal}}Ihnen{{elseformal}}dir{{endformal}} jemand helfen? Bitte {{formal}}sagen Sie{{elseformal}}sage{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 2: {{formal}}Wollen Sie{{elseformal}}Willst du{{endformal}}, dass {{formal}}Ihnen{{elseformal}}dir{{endformal}} jemand hilft? Bitte {{formal}}sagen Sie{{elseformal}}sage{{endformal}} JA oder NEIN.</p> <p>Zufallsvariable Version 3: {{formal}}Möchten Sie{{elseformal}}Möchtest du{{endformal}} Hilfe? Bitte {{formal}}sagen</p>

		schönen Abend und eine gute Nacht wünsche ich Ihnen! Gute Nacht!	Sie sage JA oder NEIN.	
	User		Ja	Nein
3	Sys		Zufallsvariable Version 1: Ich rufe jetzt \$Pflegerin\$.	Zufallsvariable Version 1: Ich werde Sie dich in 30 Minuten wieder an die Körperpflege erinnern.
			Zufallsvariable Version 2: Ich rufe jetzt das Pflegepersonal .	Zufallsvariable Version 2: In 10 Minuten werde ich Sie dich noch einmal an die Körperpflege erinnern.
				Zufallsvariable Version 3: Körperpflege ist wichtig! In 10 Minuten erinnere ich Sie dich daran noch einmal.

4.2.1.1.3. Erinnerung an die Einnahme von Medikamenten

Turn	DP	Text
1	Sys	<p>Zufallsvariable Version 1: Hallo hier ist \$astro\$. Es ist \$time\$ Ich möchte Sie Dich an die Einnahme Ihrer Deiner Medikamente erinnern Haben Sie Hast Du sie schon eingenommen? Bitte antworte n Sie mit JA oder NEIN.</p> <p>Zufallsvariable Version 2: Hallo hier ist \$astro\$. Es ist \$time\$ Der Arzt hat Ihnen dir Medikamente verschrieben. Haben Sie Hast Du sie schon eingenommen? Bitte antworte n Sie mit JA oder NEIN.</p>

		<p>Zufallsvariable Version 3: Hallo hier ist \$astro\$. Es ist \$time\$ Ich möchte {{formal}}Sie{{elseformal}}Dich{{endformal}} an {{formal}}Ihre{{elseformal}}Deine{{endformal}} Medikamente erinnern. {{formal}}Haben Sie{{elseformal}}Hast Du{{endformal}} sie schon eingenommen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p>	
2	User	Ja	Nein
		<p>Zufallsvariable Version 1: Danke, ich finde es gut, dass {{formal}}Sie{{elseformal}}Du{{endformal}} daran gedacht {{formal}}haben{{elseformal}}hast{{endforma l}}).</p> <p>Zufallsvariable Version 2: Danke, es ist gut, dass {{formal}}Sie{{elseformal}}Du{{endformal}} das schon gemacht {{formal}}haben{{elseformal}}hast{{endform al}}).</p> <p>Zufallsvariable Version 3: Ich freue mich, dass {{formal}}Sie s{{elseformal}}Du d{{endformal}}ich daran erinnert {{formal}}haben{{elseformal}}hast{{endforma l}}).</p>	<p>Zufallsvariable Version 1: Bitte {{formal}}nehmen Sie{{elseformal}}nimm{{endformal}} die Medikamente jetzt ein. {{formal}}Sie wissen{{elseformal}}Du weißst{{endformal}}, es ist sehr wichtig für {{formal}}Sie{{elseformal}}Dich{{endform al}}. Ich werde {{formal}}Sie{{elseformal}}Dich{{endform al}} in 10 Minuten noch einmal daran erinnern.</p> <p>Zufallsvariable Version 2: Die Medikamente sind wichtig für {{formal}}Sie{{elseformal}}dich{{endform al}}. Bitte {{formal}}nehmen Sie{{elseformal}}nimm{{endformal}} sie jetzt ein. In 10 Minuten melde ich mich noch einmal und erinnere {{formal}}Sie{{elseformal}}dich{{endform al}} wieder daran. Bis später!</p> <p>Zufallsvariable Version 3: Schade. Bitte {{formal}}nehmen Sie{{elseformal}}nimm{{endformal}} die Medikamente doch ein. Sie helfen {{formal}}Ihnen{{elseformal}}dir{{endforma l}}. Danke!</p>
3	Sys	<p>Zufallsvariable Version 1: Hallo hier ist \$astro\$. Es ist \$time\$. Ich erinnere {{formal}}Sie{{elseformal}}Dich{{endformal}} jetzt wieder an die Einnahme {{formal}}Ihrer{{elseformal}}Deiner{{endformal}} Medikamente. {{formal}}Haben</p>	

		<p>Sie{{elseformal}}Hast Du{{endformal}} sie schon eingenommen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 2: Hallo hier ist \$astro\$. Es ist \$time\$. Hallo hier ist wieder \$astro\$. {{formal}}Ihre{{elseformal}}Deine{{endformal}} Medikamente sind wichtig für {{formal}}Sie{{elseformal}}dich{{endformal}}. {{formal}}Haben Sie{{elseformal}}Hast Du{{endformal}} sie schon eingenommen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 3: Hallo hier ist \$astro\$. Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}Dich{{endformal}} wieder an {{formal}}Ihre{{elseformal}}Deine{{endformal}} Medikamente erinnern.{{formal}}Haben Sie{{elseformal}}Hast Du{{endformal}} sie schon eingenommen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p>
	User	Nein
	Sys	Ich rufe jetzt \$Pflegerin\$, damit Sie Dir hilft!

4.2.1.1.4. Erinnerung an regelmäßiges Trinken

T u r n	DP	Text
1	Sys	<p>Zufallsvariable Version 1: Hallo hier ist \$astro\$. Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}Dich{{endformal}} daran erinnern: Regelmäßiges Trinken ist für {{formal}}Ihren{{elseformal}}Deinen{{endformal}} Körper gesund und wichtig. {{formal}}Haben Sie Ihr{{elseformal}}Hast Du dein{{endformal}} \$Wasser\$ schon getrunken? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 2: Hallo hier ist \$astro\$. Es ist \$time\$. Regelmäßiges Trinken ist für {{formal}}Ihren{{elseformal}}Deinen{{endformal}} Körper wichtig. Hast Du \$Wasser\$ schon getrunken?</p>

		Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN. Zufallsvariable Version 3: Hallo hier ist \$astro\$. Es ist \$time\$. {{formal}}Sie wissen{{elseformal}}Du weißt{{endformal}}, dass regelmäßiges Trinken für die Gesundheit wichtig ist. {{formal}}Haben Sie{{elseformal}}Hast Du{{endformal}} \$Wasser\$ schon getrunken? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.	
	User	Ja	Nein
	Sys	Zufallsvariable Version 1: Danke, ich finde es gut / freue mich / bin zufrieden, dass {{formal}}Sie{{elseformal}}Du{{endformal}} } daran gedacht {{formal}}haben{{elsformal}}hast{{endformal}}. Zufallsvariable Version 2: Danke, bin froh, dass {{formal}}Sie{{elseformal}}Du{{endformal}} } daran gedacht {{formal}}haben{{elsformal}}hast{{endformal}}. Zufallsvariable Version 3: Danke, schön, dass {{formal}}Sie{{elseformal}}Du{{endformal}} } es schon gemacht {{formal}}haben{{elsformal}}hast{{endformal}}.	Zufallsvariable Version 1: Bitte trinke{{formal}}n Sie{{endformal}} jetzt ein Glas \$Wasser\$. {{formal}}Sie wissen{{elseformal}}Du weißt{{endformal}} es ist sehr wichtig für {{formal}}Sie{{elseformal}}Dich{{endformal}}, {{formal}}Sie werden{{elseformal}}du wirst{{endformal}} merken, dass es {{formal}}Ihnen{{elseformal}}dir{{endformal}} gut tut. Hast Du noch genügend \$Wasser\$? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN. Zufallsvariable Version 2: Bitte trinke{{formal}}n Sie{{endformal}} jetzt ein Glas \$Wasser\$. Es wird {{formal}}Ihnen{{elseformal}}dir{{endformal}} gut tun! {{formal}}Haben Sie{{elseformal}}Hast Du{{endformal}} noch genug \$Wasser\$? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.
	User	Ja	Nein
		Zufallsvariable Version 1: Danke, ich finde es gut, dass {{formal}}Sie{{elseformal}}Du{{endformal}} } so gut für dich selber {{formal}}sorgen{{elseformal}}sorgst{{endformal}}. Zufallsvariable Version 2: Danke, bin froh, dass	Zufallsvariable Version 1: Gut dann werde ich \$Pflegerin\$mitteilen sagen, dass Sie {{formal}}Ihnen{{elseformal}}dir{{endformal}} einen Krug \$Wasser\$ in {{formal}}Ihr{{elseformal}}Dein{{endformal}} Zimmer bringt! Zufallsvariable Version 2:

	<p>{{formal}}Sie{{elseformal}}Du{{endformal}} } daran gedacht {{formal}}haben{{elsformal}}hast{{endformal}} mal}}.</p> <p>Danke, schön, dass {{formal}}Sie{{elseformal}}Du{{endformal}} } es schon gemacht {{formal}}haben{{elsformal}}hast{{endformal}} mal}}.</p>	<p>Ich werde der Pflegerin dann gleich sagen, dass Sie {{formal}}Ihnen{{elseformal}}Dir{{endformal}}\$ Wasser\$ ins Zimmer bringt!</p> <p>Zufallsvariable Version 3: Dann werde ich die Pflegerin bitten, dass Sie \$Wasser\$ ins Zimmer bringt!</p>
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4.2.1.1.5. Erinnerung an Frühstück, Kaffeezeit, Mittagessen, Abendessen

4.2.1.1.5.1. Kaffeezeit

Tur n	DP	Text
1	Sys	<p>Zufallsvariable Version 1: Hallo hier ist \$astro\$. Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}Dich{{endformal}} daran erinnern, dass die Kaffeezeit in 10 Minuten beginnt. Der Kaffee duftet schon und {{formal}}Ihre{{elseformal}}Deine{{endformal}} Mitbewohner freuen sich schon auf {{formal}}Ihre{{elseformal}}Deine{{endformal}} Anwesenheit. {{formal}}Brauchen Sie{{elseformal}}Brauchst Du{{endformal}} Hilfe um in den Aufenthaltsraum zu kommen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 2: Hallo, in 10 Minuten wird im Aufenthaltsraum der Kaffee serviert. Die Mitbewohner freuen sich, wenn {{formal}}Sie{{elseformal}}du{{endformal}} auch {{formal}}kommen{{elseformal}}kommst{{endformal}}. {{formal}}Können Sie{{elseformal}}Kannst du{{endformal}} allein in den Aufenthaltsraum gehen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 3: Hallo, Ich erinnere {{formal}}Sie{{elseformal}}dich{{endformal}} daran, in 10 Minuten wird im Aufenthaltsraum der Kaffee serviert. Die Mitbewohner sind schon dort. {{formal}}Können Sie{{elseformal}}Kannst du{{endformal}} allein in den Aufenthaltsraum gehen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p>

	User	Ja	Nein
		Gut dann werde ich \$Pflegerin\$ mitteilen, dass Sie {{formal}}Ihnen{{elseformal}}Dir{{endformal}} hilft.	Zufallsvariable Version 1: Danke, ich finde es toll / gut / schön, dass {{formal}}Sie{{elseformal}}Du{{endformal}} so selbständig {{formal}}sind{{elseformal}}bist{{endformal}} Zufallsvariable Version 2: Danke, es ist toll / gut / schön, dass {{formal}}Sie{{elseformal}}Du{{endformal}}s o selbständig {{formal}}sind{{elseformal}}bist{{endformal}}

4.2.1.1.5.2. Frühstück

Turn	DP	Text
	Sys	<p>Zufallsvariable Version 1: Hallo hier ist \$astro\$. Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}Dich{{endformal}} an das Frühstück erinnern. Es wird jetzt im Speisesaal serviert. Heute gibt es \$Frühstück\$ {{formal}}Brauchen Sie{{elseformal}}Brauchst du{{endformal}} Hilfe um in den Speisesaal zu kommen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 2: Hallo hier ist \$astro\$. Es ist \$time\$. Hallo, in 10 Minuten wird im Speisaal das Frühstück serviert. {{formal}}Können Sie{{elseformal}}Kannst du{{endformal}} allein in den Aufenthaltsraum gehen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 3: Hallo hier ist \$astro\$. Es ist \$time\$. Hallo, Ich erinnere {{formal}}Sie{{elseformal}}dich{{endformal}} daran, in 10 Minuten fängt</p>

		im Speisesaal das Frühstück an. {{formal}} Brauchen Sie {{elseformal}} Brauchst du {{endformal}} Hilfe um in den Speisesaal zu kommen? Bitte antworte {{formal}} n Sie {{endformal}} mit JA oder NEIN.	
	User	Ja	Nein
		Gut dann werde ich \$Pflegerin\$ mitteilen, dass Sie {{formal}} Ihnen {{elseformal}} Dir {{endformal}} hilft.	Zufallsvariable Version 1: Danke, ich finde es toll / schön / gut, dass {{formal}} Sie {{elseformal}} Du {{endformal}} so selbständig {{formal}} sind {{elseformal}} bist {{endformal}} }. Zufallsvariable Version 2: Danke, es ist toll / gut / schön, dass {{formal}} Sie {{elseformal}} Du {{endformal}} so selbständig {{formal}} sind {{elseformal}} bist {{endformal}} }.

4.2.1.1.5.3. Mittagessen

Tur n	D P	Text
1		<p>Zufallsvariable Version 1: Hallo hier ist \$astro\$. Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}Dich{{endformal}} an das Mittagessen erinnern. Es wird jetzt im Speisesaal serviert. Heute gibt es \$Mittagessen\$ {{formal}}Brauchen Sie{{elseformal}}Brauchst du{{endformal}} Hilfe um in den Speisesaal zu kommen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 2: Hallo, in 10 Minuten wird im Speisaal das Mittagessen serviert. {{formal}}Können Sie{{elseformal}}Kannst du{{endformal}} allein in den Aufenthaltsraum gehen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 3: Hallo, Ich erinnere {{formal}}Sie{{elseformal}}dich{{endformal}} daran, in 10 Minuten</p>

		fängt im Speisesaal das Mittagessen an. {{formal}} Brauchen Sie {{elseformal}} Brauchst du {{endformal}} Hilfe um in den Speisesaal zu kommen? Bitte antworte {{formal}} n Sie {{endformal}} mit JA oder NEIN.
		<p>Gut dann werde ich \$Pflegerin mitteilen, dass Sie {{formal}}Ihnen{{elseformal}}Dir{{endformal}} hilft.</p> <p>Zufallsvariable Version 1: Danke, ich finde es toll, dass {{formal}}Sie{{elseformal}}Du{{endformal}} so selbständig {{formal}}sind{{elseformal}}bist{{endformal}}.</p> <p>Zufallsvariable Version 2: Danke, es ist toll / gut / schön, dass {{formal}}Sie{{elseformal}}Du{{endformal}} so selbständig {{formal}}sind{{elseformal}}bist{{endformal}}.</p>

4.2.1.1.5.4. Abendessen

Turn	DP	Text
	Sys	<p>Zufallsvariable Version 1: Hallo hier ist \$astro\$. Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}Dich{{endformal}} an das Abendessen erinnern. Es wird jetzt im Speisesaal serviert. Heute gibt es \$Abendessen\$ {{formal}}Brauchen Sie{{elseformal}}Brauchst du{{endformal}} Hilfe um in den Speisesaal zu kommen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 2: Hallo, in 10 Minuten wird im Speisaal das Abendessen serviert. {{formal}}Können Sie{{elseformal}}Kannst du{{endformal}} allein in den Aufenthaltsraum gehen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.</p> <p>Zufallsvariable Version 3: Hallo, Ich erinnere {{formal}}Sie{{elseformal}}dich{{endformal}} daran, in 10 Minuten fängt</p>

		im Speisesaal das Abendessen an. {{formal}} Brauchen Sie {{elseformal}} Brauchst du {{endformal}} Hilfe um in den Speisesaal zu kommen? Bitte antworte {{formal}} n Sie {{endformal}} mit JA oder NEIN.	
	User	Ja	Nein
		Gut dann werde ich \$Pflegerin\$ mitteilen, dass Sie {{formal}} Ihnen {{elseformal}} Dir {{endformal}} hilft.	Zufallsvariable Version 1: Danke, ich finde es toll / schön / gut, dass {{formal}} Sie {{elseformal}} Du {{endformal}} so selbständig {{formal}} sind {{elseformal}} bist {{endformal}} }. Zufallsvariable Version 2: Danke, es ist toll / gut / schön, dass {{formal}} Sie {{elseformal}} Du {{endformal}} so selbständig {{formal}} sind {{elseformal}} bist {{endformal}} }.

4.2.1.1.6. Erinnerung an Skypetelefonate

Turn	DP	Text	
		Hallo hier ist \$astro\$ Es ist \$time\$. \$Person\$ wartet wie immer am \$Tag\$ auf {{formal}} Ihren {{elseformal}} Deinen {{endformal}} Anruf! Soll ich jetzt für {{formal}} Sie {{elseformal}} dich {{endformal}} wählen? Bitte antworte {{formal}} n Sie {{endformal}} mit JA oder NEIN.	
	User	Ja	Nein
		Zufallsvariable Version 1: Gut dann werde ich versuchen \$Person\$ zu erreichen. Bitte ein wenig Geduld. Zufallsvariable Version 2: Gut dann rufe ich jetzt \$Person\$ an. Bitte hab {{formal}} en Sie {{endformal}} ein wenig Geduld.	Zufallsvariable Version 1: {{formal}} Sie wollen {{elseformal}} Du willst {{endformal}} heute nicht mit \$Person\$ sprechen. Ich werde es \$Person\$ gleich sagen. Zufallsvariable Version 2: Ich verstehe. {{formal}} Sie wollen {{elseformal}} Du willst {{endformal}} heute nicht mit \$Person\$ sprechen. Ich werde es \$Person\$ gleich sagen.

4.2.1.1.7. Skype Anruf annehmen

Turn	DP	Text
		Hallo hier ist \$astro\$ Es ist \$time\$. \$Person\$ruft an! {{formal}}Möchtest du{{elseformal}}Möchten Sie{{endformal}} den Anruf jetzt annehmen? Bitte antworte{{formal}}n Sie{{endformal}} mit JA oder NEIN.
	User	Ja
		Zufallsvariable Version 1: Gut dann werde ich versuchen \$Person\$ zu erreichen. Bitte ein wenig Geduld. Zufallsvariable Version 2: Gut dann rufe ich jetzt \$Person\$ an. Bitte hab{{formal}}en Sie{{endformal}} ein wenig Geduld.
		Nein Zufallsvariable Version 1: {{formal}}Sie wollen{{elseformal}}Du willst{{endformal}} heute nicht mit \$Person\$ sprechen. Ich werde es \$Person\$ gleich sagen. Zufallsvariable Version 2: Ich verstehe. {{formal}}Sie wollen{{elseformal}}Du willst{{endformal}} heute nicht mit \$Person\$ sprechen. Ich werde es \$Person\$ gleich sagen.

4.2.1.2. Erinnerungen ohne Bestätigungsanforderung

4.2.1.2.1. Veranstaltungen der Humanitas (Allgemeine Termine)

Turn	DP	Text
	Sys	Zufallsvariable Version 1: Hallo hier ist \$astro\$ Es ist \$time\$. Ich möchte {{formal}}Sie{{elseformal}}dich{{endformal}} daran erinnern dass in 15 Minuten das \$event\$ in \$eventplace\$ beginnt. \$Pflegerin\$ freut sich schon auf {{formal}}Ihren{{elseformal}}Deinen{{endformal}} Besuch! Zufallsvariable Version 2: Hallo hier ist \$astro\$ Es ist \$time\$. Hallo, in 15 Minuten beginnt das \$event\$ in \$eventplace\$. Ich möchte {{formal}}Sie{{elseformal}}dich{{endformal}} daran erinnern. \$Pflegerin\$ freut sich schon auf {{formal}}Ihren{{elseformal}}Deinen{{endformal}} Besuch! Zufallsvariable Version 3:

		Hallo hier ist \$astro\$ Es ist \$time\$. Hallo, das \$event\$ beginnt in 10 Minuten im \$eventplace\$. \$Pflegerin\$ freut sich schon auf {{formal}}Ihren{{elseformal}}Deinen{{endformal}} Besuch!
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4.2.1.2.2. Persönliche Termine

Turn	DP	Text
	Sys	Hallo hier ist \$astro\$. Ich möchte {{formal}}Sie{{elseformal}}dich{{endformal}} an {{formal}}Ihre{{elseformal}}deine{{endformal}} Termine erinnern, die {{formal}}Sie heute haben{{elseformal}}Du heute hast{{endformal}}: Um \$time1\$ ist \$event1\$ in \$eventplace\$. Um \$time2\$ hast Du \$event2\$. Um \$time3\$ kommt {{formal}}Sie{{elseformal}}dich{{endformal}} \$Person\$ besuchen Wichtig ist auch: \$Person\$ hat heute \$event3\$. \$Person2\$ hat nächste Woche \$event3\$. Ich wünsche {{formal}}Ihnen{{elseformal}}Dir{{endformal}} einen schönen Tag

Dialogue Specifications in English

4.2.1.3. Memory functions with confirmation requirements

Legende:

Turn: Dialogue cycle

DP: Dialogue Partner

User: Voice Input

Sys: System information (names, time, \$example\$ = adjustable variable)

Syn– Speech Synthesis

4.2.1.3.1. Get-Up-Dialogue – Alarm-function – Personal hygiene and dress up in the morning

Turn	DP	Text
1	Sys	Random variable version 1: Good morning, this is \$astro\$.

		<p>It is \$time\$.</p> <p>I want to ask you, have you already washed or showered and dressed up for the day? Please say YES or NO.</p> <p>Random variable version 2: Good morning, \$astro\$ speaking. It is \$time\$.</p> <p>I want to ask you, have you already washed or showered? Have you already dressed up for the day? Please say YES or NO.</p> <p>Random variable version 3: Good morning, \$astro\$ is here. It is \$time\$.</p> <p>Have you already washed or showered? And have you already dressed up for the day? Please say YES or NO.</p>		
	User	Yes	No	
2	Sys	<p>Random variable version 1: I'm glad! You look very nice today! Do you want to look through your appointments? Please say YES or NO.</p> <p>Random variable version 2: This is good! I'm confident that you are looking pretty nice today! Do you want to look through your appointments? Please say YES or NO.</p>	<p>Random variable version 4: Should someone help you? Please say YES or NO.</p> <p>Random variable version 4: Do you want help? Please say YES or NO.</p>	
	User	Yes	Yes	No
3	Sys	I wish you a nice day!	I call \$nurse \$ now.	<p>Random variable version 1: In 10 minutes I'll remind you again about your personal hygiene.</p> <p>Random variable version 2: Body care is important! I'll remind you again in 10 minutes</p>

4.2.1.3.2. Personal Hygiene and undressing evening

Turn	DP	Text				
1	Sys	<p>Random variable version 1: Good evening, \$astro\$ here. It is \$time\$.</p> <p>I want to ask you, have you already washed yourself, cleaned your teeth and dressed for the evening? Please say YES or NO.</p> <p>Random variable version 2: Good evening, \$astro\$ here. It is \$time\$.</p> <p>I want to remind you for personal hygiene! Have you already cleaned your teeth? Have you had a bath or a shower? Have you dressed up for the evening? Please say YES or NO.</p> <p>Random variable version 3: Good evening, \$astro\$ here. It is \$time\$.</p> <p>It is time for your personal hygiene. Have you already washed and dressed up for the evening? Please say YES or NO.</p>				
	User	<table border="1"> <thead> <tr> <th>Yes</th> <th>No</th> </tr> </thead> <tbody> <tr> <td> <p>Random variable version 1: I'm glad! I wish you a pleasant evening and restful sleep. See you tomorrow!</p> <p>Random variable version 2: Very good! I wish you a pleasant evening! Sleep well!</p> <p>Random variable version 3: I'm very glad! I wish you a pleasant evening and a good night!</p> </td> <td> <p>Random variable version 1: Do you need support? Please say YES or NO.</p> <p>Random variable version 2: Do you want somebody to help you? Please say YES or NO.</p> <p>Random variable version 3: Do you need help? Please say YES or NO.</p> </td> </tr> </tbody> </table>	Yes	No	<p>Random variable version 1: I'm glad! I wish you a pleasant evening and restful sleep. See you tomorrow!</p> <p>Random variable version 2: Very good! I wish you a pleasant evening! Sleep well!</p> <p>Random variable version 3: I'm very glad! I wish you a pleasant evening and a good night!</p>	<p>Random variable version 1: Do you need support? Please say YES or NO.</p> <p>Random variable version 2: Do you want somebody to help you? Please say YES or NO.</p> <p>Random variable version 3: Do you need help? Please say YES or NO.</p>
Yes	No					
<p>Random variable version 1: I'm glad! I wish you a pleasant evening and restful sleep. See you tomorrow!</p> <p>Random variable version 2: Very good! I wish you a pleasant evening! Sleep well!</p> <p>Random variable version 3: I'm very glad! I wish you a pleasant evening and a good night!</p>	<p>Random variable version 1: Do you need support? Please say YES or NO.</p> <p>Random variable version 2: Do you want somebody to help you? Please say YES or NO.</p> <p>Random variable version 3: Do you need help? Please say YES or NO.</p>					
	User	<table border="1"> <thead> <tr> <th>Yes</th> <th>No</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Yes	No		
Yes	No					
3	Sys	<table border="1"> <thead> <tr> <th>Random variable</th> <th>Random variable version 1: I'll remind you again in 30 minutes.</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Random variable	Random variable version 1: I'll remind you again in 30 minutes.		
Random variable	Random variable version 1: I'll remind you again in 30 minutes.					

			<p>version 1: I'll call a caregiver now. Random variable</p> <p>version 2: I'll call help now.</p>	<p>Random variable version 2: In 10 minutes I'll remind you again for your personal hygiene.</p> <p>Random variable version 3: Personal hygiene is important! In 10 minutes I'll remind you again.</p>
--	--	--	--	--

4.2.1.3.3. Drug taking reminder

Turn	DP	Text
1	Sys	<p>Random variable version 1: Hello \$astro\$ is here. It is \$time\$. I want to remind you to take your medication. Have you already taken it? Please answer with YES or NO.</p> <p>Random variable version 2: Hello \$astro\$ is here. It is \$time\$. The doctor prescribed medication to you. Have you already taken it? Please answer with YES or NO.</p> <p>Random variable version 3: Hello \$astro\$ is here. It is \$time\$. I want to remind you about your medication. Have you already taken it? Please answer with YES or NO.</p>
2	User	<p>Yes</p>
	Sys	<p>Random variable version 1: Thanks, I think it is good that you have thought about it.</p> <p>Random variable version 2: Thanks, it is good, that you already have done it.</p> <p>Random variable version 3: I am very glad that you remembered.</p>
		<p>No</p> <p>Random variable version 1: Please take your medication now. You know that it's very important for you. I will remind you again in 10 minutes.</p> <p>Random variable version 2: Medication is important for you. Please take it now. I'll check back with you in 10 minutes.</p> <p>Random variable version 3:</p>

			Too bad. Please take your medication. It'll help you. Thanks!
3	Sys	<p>Random variable version 1: Hello \$astro\$ is here. It is \$time\$. I want to remind you again to take your medication. Have you already taken it? Please answer with YES or NO.</p> <p>Random variable version 2: Hello \$astro\$ is here. It is \$time\$. Your medication is important for you. Have you already taken it? Please answer with YES or NO.</p> <p>Random variable version 3: Hello \$astro\$ is here. It's \$time\$. I want to remind you again to take your medication. Have you already taken it? Please answer with YES or NO.</p>	
	User	Yes	No
	Sys	Thanks, I think it is good that you have thought about it.	I'll call \$nurse\$ now, so she can help you.

4.2.1.3.4. Periodical drinking reminder

Turn	DP	Text
1	Sys	<p>Random variable version 1: Hello \$astro\$ is here. It's \$time\$. I want to remind you that staying hydrated is important and vital for your body. Have you had something to drink recently? Please answer with YES or NO.</p> <p>Random variable version 2: Hello \$astro\$ is here. It's \$time\$. Drinking regularly is important for your body. Have you already had something to drink? Please answer with YES or NO.</p>

		<p>Random variable version 3: Hello \$astro\$ is here. It's \$time\$.</p> <p>You know that staying hydrated is important for your health. Have you had something to drink recently? Please answer with YES or NO.</p>	
	User	Yes	No
	Sys	<p>Random variable version 1: Thanks, I think it is good, that you have thought of it.</p> <p>Random variable version 2: Thanks, I am glad that you have thought of it.</p> <p>Random variable version 3: Thanks, great that you have already done it.</p>	<p>Random variable version 1: Please have a cup of tea. You know it is very important and you will notice that it is good for you. Do you have enough tea? Please answer with YES or NO.</p> <p>Random variable version 2: Please have a cup of tea. It is good for you! Do you have enough tea? Please answer with YES or NO.</p>
	User	Yes	No
		<p>Random variable version 1: Thanks, I think it is good, that you take such good care of yourself.</p> <p>Random variable version 2: Thanks, I am glad, that you have thought about it.</p> <p>Random variable version 3: Thanks, great that you have already done it</p>	<p>Random variable version 1: Well, then I will tell \$nurse\$, that she can bring a cup of tea to your room!</p> <p>Random variable version 2: I will tell \$nurse\$ that she can bring a cup of tea to your room.</p> <p>Random variable version 3: Then I will tell \$nurse\$ that she can bring a cup of tea to your room.</p>

4.2.1.3.5. Reminder for breakfast, coffee time, lunch, and dinner

4.2.1.3.5.1. coffee time

Turn	DP	Text
1	Sys	<p>Random variable version 1: Hello \$astro\$ is here. It is \$time\$.</p> <p>I want to remind you, that the coffee time begins in 10 minutes. Your roommates are</p>

		<p>already looking forward to seeing you. Do you need support to get into the lounge? Please answer with YES or NO.</p> <p>Random variable version 2: Hello \$astro\$ is here. It is \$time\$. In 10 minutes there will be coffee served in the lobby. Your roommates look forward to you coming too. Do you need help to get there? Please answer with YES or NO.</p> <p>Random variable version 3: Hello \$astro\$ is here. It is \$time\$. I remind you that in 10 minutes coffee gets served in the lobby. Your roommates are already there. Do you need help to get into the lobby? Please answer with YES or NO.</p>	
	User	Yes	No
	Sys	Well then I'll call \$nurse\$ for support.	<p>Random variable version 1: Thanks, I think it's great, that you are so independent.</p> <p>Random variable version 2: Thanks, it's great, that you are so independently.</p>

4.2.1.3.5.2. Breakfast

Turn	DP	Text
1	Sys	<p>Random variable version 1: Hello here is \$astro\$. It is \$time\$. I want to remind you of breakfast. It gets served in the lounge. Do you need support to get to the lounge? Please answer with YES or NO.</p> <p>Random variable version 2: Hello here is \$astro\$. It is \$time\$. In 10 minutes the breakfast gets served in the lounge. Do you need help to get there? Please answer with YES or NO.</p> <p>Random variable version 3: Hello here is \$astro\$.</p>

		<p>It is \$time\$.</p> <p>Hello, I want to remind you that the breakfast starts in 10 minutes in the lounge. Do you need help to get to the lounge? Please answer with YES or NO.</p>	
	User	Yes	No
	Sys	<p>Good then I will tell \$nurse\$ that she will help you.</p>	<p>Random variable version 1: Thanks, I think it's great, that you are so independent.</p> <p>Random variable version 2: Thanks, it is great that you are so independent.</p>

4.2.1.3.5.3. lunch

Turn	DP	Text	
1	Sys	<p>Random variable version 1: Hello here is \$astro\$.</p> <p>It is \$time\$.</p> <p>I want to remind you of lunch. It gets served in the lounge in 10 minutes. Do you need support to get to the lounge? Please answer with YES or NO.</p> <p>Random variable version 2: Hello here is \$astro\$.</p> <p>It is \$time\$.</p> <p>In 10 minutes the lunch gets served in the lounge. Do you need help to get there? Please answer with YES or NO.</p> <p>Random variable version 3: Hello here is \$astro\$.</p> <p>It is \$time\$.</p> <p>I want to remind you that the lunch starts in 10 minutes in the lounge. Do you need help to get to the lounge? Please answer with YES or NO.</p>	
	User	Yes	No
	Sys	<p>Good, then I will tell \$nurse\$ that she will help you.</p>	<p>Random variable version 1: Thanks, I think it's great, that you are so independent.</p> <p>Random variable version 2: Thanks, it is great that you are so independent.</p>

4.2.1.3.5.4. dinner

Turn	DP	Text
	Sys	<p>Random variable version 1: Hello here is \$astro\$. It is \$time\$. I want to remind you of dinner. It gets served in the lounge. Do you need support to get to the lounge? Please answer with YES or NO.</p> <p>Random variable version 2: Hello here is \$astro\$. It is \$time\$. In 10 minutes the dinner gets served in the lounge. Do you need help to get there? Please answer with YES or NO.</p> <p>Random variable version 3: Hello here is \$astro\$. It is \$time\$. I want to remind you that the dinner starts in 10 minutes in the lounge. Do you need help to get to the lounge? Please answer with YES or NO.</p>
	User	<p>Yes</p>
	Sys	<p>Good, then I will tell \$nurse\$ and she will help you.</p>
		<p>No</p> <p>Random variable version 1: Thanks, I think it is great, that you are so independent. Random variable version 2: Thanks, it is great that you are so independent.</p>

4.2.1.3.6. Skype call reminder

Turn	DP	Text
	Sys	<p>Hello, \$astro\$ is here. It is \$time\$. \$Person\$ is waiting for your call like every \$day\$! Should I call for you? Please answer with YES or NO.</p>
	User	<p>Yes</p>
		<p>No</p>

	Sys	<p>Random variable version 1: Well, then I will try to call \$Person\$. Please be patient.</p> <p>Random variable version 2: Well, then I will call \$Person\$. Please be patient.</p>	<p>Random variable version 1: You do not want to talk with \$Person\$. I will say it to \$Person\$ now.</p> <p>Random variable version 2: I understand. You do not want to talk with \$Person\$. I will say it to \$Person\$ now.</p>
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4.2.1.3.7. Incoming skype call

Turn	DP	Text	
	Sys	<p>Hello, \$astro\$ is here. It is \$time\$. \$person\$ is calling you! Do you want to talk with \$person\$? Please answer with YES or NO.</p>	
	User	Yes	No
	Sys	The system establishes the connection.	<p>Random variable version 1: You do not want to talk with \$Person\$ now. That's okay. Maybe later.</p> <p>Random variable version 2: I understand. You do not want to talk with \$Person\$.</p>

4.2.1.4. Reminder without confirmation requirement

4.2.1.4.1. Reminder functions of events

Turn	DP	Text
	Sys	<p>Random variable version 1: Hello, \$astro\$ is here. It is \$time\$. I want to remind you that memory training starts in room 12. Mrs. Schreibmeier is looking forward on your visit!</p> <p>Random variable version 2: Hello, \$astro\$ is here. It is \$time\$. Hello, in 15 minutes the memory training starts in room 12. I want to remind you. Mrs. Schreibmeier is looking forward on your visit!</p> <p>Random variable version 3:</p>

		<p>Hello, \$astro\$ is here. It is \$time\$. Hello, \$event\$ training starts in 10 minutes in \$eventplace\$. \$nurse\$ is looking forward on your visit!</p>
--	--	---

4.2.1.4.2. Personal appointments

Turn	DP	Text
	Sys	<p>Event: %1 (%2 %3) Location: %4</p> <p>Do you want to show this reminder again at a later time? Please answer with yes or no.</p>

Dialogue specifications in Italian

4.2.1.5. Funzioni del ricordo con richiesta di conferma

Leggenda:

Turn: ciclo di dialogo

DP: partner del dialogo

User: input del linguaggio

Sys: informazioni del sistema (nomi, ora, \$example\$ = adjustablevariable)

Syn– sintesi del linguaggio

4.2.1.5.1. Alzarsi-dialogo – funzione sveglia – igiene corporea e vestirsi la mattina

Turn	DP	Text
1	Sys	<p>Variabile casuale versione 1: Buongiorno, sono \$astro\$. Sono le \$time\$.</p> <p>{{formal}}Le{{elseformal}}Ti{{endformal}} vorrei chiedere se {{formal}} si è{{elseformal}} ti sei{{endformal}} già lavat{{gender}}o{{elsegender}}a{{endgender}} o se {{formal}}ha{{elseformal}}hai{{endformal}} fatto la doccia e se {{formal}} si è {{elseformal}}ti sei{{endformal}} vestit{{gender}}o{{elsegender}}a{{endgender}} per il</p>

		<p>giorno? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con SÌ o NO.</p> <p>Variabile casuale versione 2: Buongiorno, sono \$astro\$. Sono le \$time\$, {{formal}}Le{{elseformal}}ti{{endformal}} chiedo se {{formal}}si è{{elseformal}}sei{{endformal}} già lavat{{gender}}o{{elsegender}}a{{endgender}} o se {{formal}}ha{{elseformal}}hai{{endformal}} già fatto la doccia? {{formal}} Si è {{elseformal}} Ti sei {{endformal}} già vestit{{gender}}o{{elsegender}}a{{endgender}}? Per favore {{formal}} risponda{{elseformal}}rispondi{{endformal}} con SÌ o NO.</p> <p>Variabile casuale versione 3: Buongiorno, sono \$astro\$. Sono le \$time\$, {{formal}}si è{{elseformal}}ti sei{{endformal}} già lavat{{gender}}o{{elsegender}}a{{endgender}} o {{formal}}ha{{elseformal}}hai{{endformal}} già fatto la doccia? E {{formal}}si è{{elseformal}}ti sei{{endformal}} già vestit{{gender}}o{{elsegender}}a{{endgender}}? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con SÌ o NO.</p>	
	User	Sì	No
2	Sys	<p>Variabile casuale versione 1: ???</p> <p>Molto bene! Oggi {{formal}}ha{{elseformal}}hai{{endformal}} un aspetto particolarmente bello. {{formal}}Vorrebbe{{elseformal}}Vorresti {{endformal}} controllare {{formal}}i Suoi{{elseformal}}i tuoi{{endformal}} appuntamenti? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}}con SÌ o NO ???</p> <p>Variabile casuale versione 2: Va bene. Sono sicuro che {{formal}}è{{elseformal}}sei{{endformal}} molto bell{{gender}}o{{elsegender}}a{{endgender}} oggi</p> <p>Variabile casuale versione 3: Molto bene. Spero che il giorno sia cominciato bene.</p>	<p>Variabile casuale versione 1: {{formal}}La{{elseformal}}Ti{{endformal}} deve aiutare qualcuno?Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con sì o no</p> <p>Variabile casuale versione 2 : {{formal}}vuole{{elseformal}}Vuoi {{endformal}}che qualcuno {{formal}}Le{{elseformal}}ti{{endformal}}dia una mano?</p> <p>Variabile casuale versione 3: {{formal}}Ha{{elseformal}}Hai{{endformal}} bisogno di aiuto?</p>

	User	No	Sì	No
3	Sys	<p>LeTe auguro una buona giornata!</p>	<p>Variabile casuale 1: Va bene. Sono sicuro che èseimolto bellerooagendera{endgender} oggi</p> <p>Variabile casuale 1: Molto bene. Spero che il giorno sia cominciato bene.</p>	<p>Variabile casuale versione 1: Fra dieci minuti LeTe ti ricorderò la cura del corpo.</p> <p>Variabile casuale versione 2: Fra dieci minuti LeTe ti ricorderò ancora una volta la cura del corpo.</p>

4.2.1.5.2. Igiene corporea e svestirsi la sera

Turn	DP	Text
1	Sys	<p>Variabile casuale versione 1: Buonasera, qui e \$astro\$. Sono le \$time\$.</p> <p>Vorrei chiederLeTe se si è ti sei già lavatogendero{elsegender}a{endgender} , se si è èTe sei lavatogendero{elsegender}a{endgender} i denti e se si è Te sei cambiatgendero{elsegender}a{endgender} per andare a dormire? Per favorerisponda{elseformal}rispondi{endformal} con Sì o NO.</p> <p>Variabile casuale versione 2: Buonasera, qui e \$astro\$. Sono le \$time\$.</p>

		<p>Vorrei ricordar{{formal}}Le{{elseformal}}ti{{endformal}} la cura del corpo! {{formal}}Si è{{elseformal}}Ti sei{{endformal}} lavat{{gender}}o{{elsegender}}a{{endgender}} i denti? {{formal}}Si è{{elseformal}}Ti sei{{endformal}} lavat{{gender}}o{{elsegender}}a{{endgender}}? {{formal}}si è{{elseformal}}Ti sei{{endformal}} già cambiat{{gender}}o{{elsegender}}a{{endgender}} per andare a dormire? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO</p> <p>Variabile casuale versione 3: Buonasera, qui e \$astro\$. Sono le \$time\$. È ora per la cura del corpo. {{formal}}Si è{{elseformal}}Ti sei{{endformal}} già lavat{{gender}}o{{elsegender}}a{{endgender}} e {{formal}}si è{{elseformal}}ti sei{{endformal}} già cambiat{{gender}}o{{elsegender}}a{{endgender}} per la notte? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO</p>	
	User	Sì	No
2	Sys	<p>Variabile casuale versione 1: Mi fa piacere! {{formal}}Le{{elseformal}}Ti{{e ndformal}} auguro una bella serata e che {{formal}}Lei {{elseformal}}Tu{{endformal}} dorma bene. A domani</p> <p>Variabile casuale versione 2: Molto bene! {{formal}}Le{{elseformal}}Ti{{e ndformal}} auguro una bella serata e buon riposo! Buonanotte!</p> <p>Variabile casuale versione 3: Mi fa molto piacere! {{formal}}Le{{elseformal}}Ti{{e ndformal}} auguro una buona serata e una buona notte! Buonanotte!</p>	<p>Variabile casuale versione 1: {{formal}}La{{elseformal}}Ti{{endformal}} deve aiutare qualcuno? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} }} con Sì o NO.</p> <p>Variabile casuale versione 2: {{formal}}Vuole{{elseformal}}vuoi{{endformal}} che qualcuno {{formal}}Le{{elseformal}}ti{{endformal}} dia una mano? Per favore {{formal}}risponda{{elseformal}}rispondai{{endformal}} }} con Sì o NO.</p> <p>Variabile casuale versione 3: {{formal}}Ha{{elseformal}}Hai{{endformal}} bisogno di aiuto Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} }} con Sì o NO.</p>
	User		Sì No
3	Sys		<p>Variabile casuale versione 1: Adesso chiamo una \$badante\$</p> <p>Variabile casuale versione 1: Fra 30 minuti {{formal}}Le{{elseformal}}ti{{endfor mal}} ricorderò la cura del corpo.</p>

			<p>Variabile casuale versione 2:</p> <p>Adesso chiamo il personale paramedico</p>	
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4.2.1.5.3. Ricordare di prendere i medicinali

T u r n	DP	Text
1	Sys	<p>Variabile casuale versione 1: Ciao qui è \$astro\$. Sono le \$time\$. Vorrei ricordar{{formal}}Le{{elseformal}}ti{{endformal}} di prendere {{formal}}i Suoi{{elseformal}}i tuoi{{endformal}} medicinali! Li {{formal}}hai{{elseformal}}ha{{endformal}} già presi? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p> <p>Variabile casuale versione 2: Ciao qui è \$astro\$. Sono le \$time\$. Il medico {{formal}}Le{{elseformal}}ti{{endformal}} ha prescritto dei medicinali! Li {{formal}}ha{{elseformal}}hai{{endformal}} già presi? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p> <p>Variabile casuale versione 3: Ciao qui è \$astro\$. Sono le \$time\$. Vorrei ricordar{{formal}}Le{{elseformal}}ti{{endformal}} i tuoi medicinali. Li {{formal}}ha{{elseformal}}hai{{endformal}} già presi? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p>
2	User	<p>Sì</p> <p>No</p>
	Sys	<p>Variabile casuale versione 1: Grazie, è ottimo che {{formal}}Lei{{elseformal}}tu{{endformal}} ci abbia pensato</p> <p>Variabile casuale versione 1: Per favore {{formal}}prenda{{elseformal}}prendi{{endfo rma}} adesso {{formal}}i Suoi{{elseformal}}i tuoi{{endformal}} medicinali. {{formal}}Lei</p>

		<p>Variabile casuale versione 2: Grazie, è ottimo che <code>{{formal}}lei{{elseformal}}tu{{endformal}}</code> l'abbia già fatto.</p> <p>Variabile casuale versione 3: Sono felice che <code>{{formal}}lei</code> se <code>{{elseformal}}tu te{{endformal}}</code> ne sia ricordat<code>{{gender}}o{{elsegender}}a{{endgender}}</code>.</p>	<p>sa<code>{{elseformal}}</code>Tu sai<code>{{endformal}}</code> che è molto importante per <code>{{formal}}Lei{{elseformal}}te{{endformal}}</code>. Fra dieci minuti <code>{{formal}}se{{elseformal}}te{{endformal}}</code> ne ricorderò ancora una volta.</p> <p>Variabile casuale versione 2: I medicinali sono importanti per <code>{{formal}}Lei{{elseformal}}te{{endformal}}</code>. Per favore <code>{{formal}}li</code> prenda<code>{{elseformal}}</code>prendili<code>{{endformal}}</code> adesso. Fra dieci minuti <code>{{formal}}se{{elseformal}}te{{endformal}}</code> ne ricorderò ancora una volta. A piu tardi.</p> <p>Variabile casuale versione 3: Peccato. Per favore, <code>{{formal}}prenda{{elseformal}}prendi{{endformal}}</code> i medicinali. <code>{{formal}}La{{elseformal}}Ti {{endformal}}</code> aiutano. Grazie</p>
3	Sys	<p>Variabile casuale versione 1: Ciao qui è \$astro\$. Sono le \$time\$. <code>{{formal}}Le{{elseformal}}Ti{{endformal}}</code> ricordo di nuovo di prendere <code>{{formal}}i Suoi{{elseformal}}i tuoi{{endformal}}</code> medicinali. Li <code>{{formal}}ha{{elseformal}}hai{{endformal}}</code> già presi? Per favore <code>{{formal}}risponda{{elseformal}}rispondi{{endformal}}</code> con SÌ o NO!</p> <p>Variabile casuale versione 2: Ciao qui`e di nuovo \$astro\$. <code>{{formal}}Suoi{{elseformal}}i tuoi{{endformal}}</code> medicinali sono importanti per <code>{{formal}}Lei{{elseformal}}te{{endformal}}</code>. Li <code>{{formal}}ha{{elseformal}}hai{{endformal}}</code> già presi? Per favore <code>{{formal}}risponda{{elseformal}}rispondi{{endformal}}</code> con SÌ o NO!</p> <p>Variabile casuale versione 3: Ciao qui è di nuovo \$astro\$. <code>{{formal}}Le{{elseformal}}Ti{{endformal}}</code> vorrei di nuovo ricordare ai <code>{{formal}}Suoi{{elseformal}}tuoi{{endformal}}</code> medicinali! Li <code>{{formal}}ha{{elseformal}}hai{{endformal}}</code> già presi? Per favore <code>{{formal}}risponda{{elseformal}}rispondi{{endformal}}</code> con SÌ o NO!</p>	

	User	Si	No
	Sys	Grazie, è ottimo che {{formal}}Lei{{elseformal}}tu{{endformal}} ci abbia pensato.	Adesso chiamo una \$badante\$ che {{formal}}La{{elseformal}}ti{{endformal}} aiuta!

4.2.1.5.4. ricordare di bere regolarmente

Tur n	DP	Text
1	Sys	<p>Variabile casuale versione 1: Ciao sono \$astro\$. Sono le \$time\$. Vorrei ricordar{{formal}}Le{{elseformal}}ti{{endformal}} che bere regolarmente fa bene ed è sano per il {{formal}}Suo{{elseformal}}tuo{{endformal}} corpo: {{formal}}ha{{elseformal}}hai{{endformal}} già bevuto qualcosa? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO!</p> <p>Variabile casuale versione 2: Ciao sono \$astro\$. Sono le \$time\$. Bere regolarmente fa bene al {{formal}}Suo{{elseformal}}tuo{{endformal}} corpo. {{formal}}ha{{elseformal}}hai{{endformal}} già bevuto qualcosa? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO!</p> <p>Variabile casuale versione 3: Ciao sono \$astro\$. Sono le \$time\$. {{formal}}Sa{{elseformal}}Sai{{endformal}} che bere regolarmente fa bene alla {{formal}}Sua{{elseformal}}tua{{endformal}} salute. Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p>
	User	Si
	Sys	<p>Variabile casuale versione 1: Grazie, sono contento che {{formal}}Lei{{formal}}tu{{formal}} ci abbia pensato</p> <p>Variabile casuale versione 2: Grazie, sono felice che {{formal}}Lei{{formal}}tu{{formal}} l'abbia già fatto.</p> <p>Variabile casuale versione 3:</p>
		No
		<p>Variabile casuale versione 1: Per favore {{formal}}beva{{elseformal}}bevi{{endformal}} adesso una tazza di tè. {{formal}}Sa{{elseformal}}Sai{{endformal}} che è molto importante per {{formal}}Lei{{elseformal}}te{{endformal}}. {{formal}}si accorgerà{{elseformal}}Ti accorgerai{{endformal}} che {{formal}}Le{{elseformal}}ti{{endformal}} fa bene. Ne {{formal}}ha{{elseformal}}hai{{endformal}}</p>

		<p>Grazie, è ottimo che <code>{{formal}}Lei{{formal}}tu{{formal}}</code> l'abbia già fatto.</p>	<p>ancora abbastanza? Per favore <code>{{formal}}risponda{{elseformal}}rispondi{{endformal}}</code> con Sì o NO!</p> <p>Variabile casuale versione 2: Adesso <code>{{formal}}beva{{elseformal}}bevi{{endformal}}</code> una tazza di tè. Ti farà bene, Ne <code>{{formal}}ha{{elseformal}}hai{{endformal}}</code> ancora abbastanza? Per favore <code>{{formal}}risponda{{elseformal}}rispondi{{endformal}}</code> con Sì o NO!</p>
	User	Sì	No
		<p>Variabile casuale versione 1: Grazie, sono contento che <code>{{formal}}Lei{{formal}}tu{{formal}}</code> ci abbia pensato</p> <p>Variabile casuale versione 2: Grazie, sono felice che <code>{{formal}}Lei{{formal}}tu{{formal}}</code> l'abbia già fatto.</p> <p>Variabile casuale versione 3: Grazie, è ottimo che <code>{{formal}}Lei{{formal}}tu{{formal}}</code> ab bia già fatto.</p>	<p>Variabile casuale versione 1: Lo dirò subito alla \$badante\$ che <code>{{formal}}Le{{elseformal}}ti{{endformal}}</code> porterà subito il tè nella <code>{{formal}}Sua{{elseformal}}tua{{endformal}}</code> camera!</p> <p>Variabile casuale versione 2: Allora dico alla \$badante\$ di portar<code>{{formal}}le{{elseformal}}ti{{endformal}}</code> il tè nella <code>{{formal}}Sua{{elseformal}}tua{{endformal}}</code> camera.</p> <p>Variabile casuale versione 3: Pregherò la \$badante\$ di portar<code>{{formal}}le{{elseformal}}ti{{endformal}}</code> il tè nella <code>{{formal}}Sua{{elseformal}}tua{{endformal}}</code> camera.</p>

4.2.1.5.5. ricordare la colazione, il caffè , il pranzo e la cena

4.2.1.5.5.1. pausa caffè

Tur n	DP	Text
1	Sys	Variabile casuale versione 1:

		<p>Ciao sono \$astro\$.</p> <p>Sono le \$time\$.</p> <p>Vorrei ricordar{{formal}}le{{elseformal}}ti{{endformal}} che la pausa caffè inizia fra dieci minuti. Si sente già l'odore del caffè e {{formal}}i Suoi{{elseformal}}i tuoi{{endformal}} compagni {{formal}}La{{elseformal}}ti{{endformal}} aspettano già. {{formal}}Le{{elseformal}}Ti{{endformal}} serve aiuto per andare nella sala di soggiorno?</p> <p>Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p> <p>Variabile casuale versione 2:</p> <p>Ciao sono \$astro\$.</p> <p>Sono le \$time\$.</p> <p>Ciao, fra dieci minuti viene servito il caffè nella sala di soggiorno. {{formal}}i Suoi{{elseformal}}i tuoi{{endformal}} compagni sarebbero lieti se {{formal}}venisse{{elseformal}}venissi{{endformal}} anche {{formal}}Lei{{elseformal}}tu{{endformal}}. {{formal}}Le{{elseformal}}ti{{endformal}} serve aiuto per andare nel soggiorno?</p> <p>Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p> <p>Variabile casuale versione 3:</p> <p>Ciao sono \$astro\$.</p> <p>Sono le \$time\$.</p> <p>Ciao, {{formal}}Le{{elseformal}}ti{{endformal}} ricordo che fra dieci minuti viene servito il caffè nella sala di soggiorno. {{formal}}I Suoi{{elseformal}}I tuoi{{endformal}} compagni sono già lì. {{formal}}Le{{elseformal}}ti{{endformal}} serve aiuto per andare nel soggiorno?</p> <p>Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p>	
	Use r	Sì	No
	Sys	Bene, allora comunicherò alla \$badante\$ di dar{{formal}}Le{{elseformal}}ti{{endformal}} una mano.	<p>Variabile casuale versione 1: ???</p> <p>Grazie, È ottimo che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto da sol{{gender}}o{{elsegender}}a{{endgender}}.</p> <p>Variabile casuale versione 2: Sono contento che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto autonomamente.</p>

4.2.1.5.5.2. Colazione

Turn	DP	Text
1	Sys	<p>Variabile casuale versione 1: Ciao qui è \$astro\$. Sono le \$time\$. Vorrei ricordar{{formal}}Le{{elseformal}}ti{{endformal}} la colazione. Viene servita nella sala da pranzo. Oggi c'è \$Colazione\$. {{formal}}Le{{elseformal}}Ti{{endformal}} serve aiuto per andare lì. Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p> <p>Variabile casuale versione 2: Ciao qui è \$astro\$. Sono le \$time\$. Ciao, fra dieci minuti viene servito il pranzo nella sala da pranzo. Oggi c'è \$Colazione\$. {{formal}}Può{{elseformal}}Puoi{{endformal}} andare da sol{{gender}}o{{elsegender}}a{{endgender}} nel soggiorno. Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p> <p>Variabile casuale versione 3: Ciao qui è \$astro\$. Sono le \$time\$. Ciao, {{formal}}Le{{elseformal}}ti{{endformal}} ricordo che fra dieci minuti inizierà la colazione nella sala da pranzo. {{formal}}Le{{elseformal}}Ti{{endformal}} serve aiuto per andare nella sala da pranzo? Oggi c'è \$Colazione\$. Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p>
	User	Sì
	Sys	<p>Allora informerò la \$badante\$ che {{formal}}Le{{elseformal}}ti{{endformal}} darà una mano.</p>
		No
		<p>Variabile casuale versione 1: Grazie, sono contento che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto da sol{{gender}}o{{elsegender}}a{{endgender}}</p> <p>Variabile casuale versione 2: È fantastico che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto autonomamente.</p>

4.2.1.5.5.3. pranzo

Turn	DP	Text		
1	Sys	<p>Variabile casuale versione 1: Ciao qui è \$astro\$. Sono le \$time\$. Vorrei ricordar{{formal}}Le{{elseformal}}ti{{endformal}} il pranzo. Viene servito nella sala da pranzo. Oggi c'è \$Pranzo\$ {{formal}}Le{{elseformal}}ti{{endformal}} serve aiuto per andare nella sala. Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p> <p>Variabile casuale versione 2: Ciao qui è \$astro\$. Sono le \$time\$. Ciao, fra dieci minuti viene servito il pranzo nella sala da pranzo. Oggi c'è \$Pranzo\$ {{formal}}Può{{elseformal}}Puoi{{endformal}} andare da solo nel soggiorno. Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p> <p>Variabile casuale versione 3: Ciao qui è \$astro\$. Sono le \$time\$. Ciao {{formal}}Le{{elseformal}}ti{{endformal}} ricordo che fra dieci minuti inizierà il pranzo nella sala da pranzo. {{formal}}Le{{elseformal}}Ti{{endformal}} serve aiuto per andare nella sala da pranzo? Oggi c'è \$Pranzo\$ Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p>		
	User	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">si</td> <td style="width: 50%; padding: 5px;">No</td> </tr> </table>	si	No
si	No			
	Sys	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">Allora informerò la \$badante\$ che {{formal}}Le{{elseformal}}ti{{endformal}} darà una mano.</td> <td style="width: 50%; padding: 5px;"> <p>Variabile casuale versione 1: Grazie, sono contento che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto da sol{{gender}}o{{elsegender}}a{{endgender}}.</p> <p>Variabile casuale versione 2: Grazie, è fantastico che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto autonomamente.</p> </td> </tr> </table>	Allora informerò la \$badante\$ che {{formal}}Le{{elseformal}}ti{{endformal}} darà una mano.	<p>Variabile casuale versione 1: Grazie, sono contento che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto da sol{{gender}}o{{elsegender}}a{{endgender}}.</p> <p>Variabile casuale versione 2: Grazie, è fantastico che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto autonomamente.</p>
Allora informerò la \$badante\$ che {{formal}}Le{{elseformal}}ti{{endformal}} darà una mano.	<p>Variabile casuale versione 1: Grazie, sono contento che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto da sol{{gender}}o{{elsegender}}a{{endgender}}.</p> <p>Variabile casuale versione 2: Grazie, è fantastico che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto autonomamente.</p>			

4.2.1.5.5.4. cena

Turn	DP	Text
	Sys	<p>Variabile casuale versione 1: Ciao qui è \$astro\$. Sono le \$time\$. Vorrei ricordar{{formal}}le{{elseformal}}ti{{endformal}} la cena. Viene servita nella sala da pranzo. Oggi c'è \$cena\$ {{formal}}Le{{elseformal}}Ti{{endformal}} serve aiuto per andare nella sala da pranzo. Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p> <p>Variabile casuale versione 2: Ciao qui è \$astro\$. Sono le \$time\$. Ciao fra dieci minuti viene servita la cena nella sala da pranzo. Oggi c'è \$cena\$. {{formal}}Le{{elseformal}}Ti{{endformal}} serve aiuto per andare nella sala. Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p> <p>Variabile casuale versione 3: Ciao qui è \$astro\$. Sono le \$time\$. Ciao {{formal}}Le{{elseformal}}ti{{endformal}} ricordo che fra 10 minuti inizierà la cena nella sala da pranzo. Oggi c'è \$cena\$ {{formal}}Le{{elseformal}}Ti{{endformal}} serve aiuto per andare nella sala. Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.</p>
	User	<p>Sì</p> <p>No</p>
	Sys	<p>Bene, allora comunicherò alla \$badante\$ che {{formal}}Le{{elseformal}}ti{{endformal}} } darà una mano.</p> <p>Variabile casuale versione 1: Grazie, sono contento che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto da sol{{gender}}o{{elsegender}}a{{endgender}}.</p> <p>Variabile casuale versione 2: Grazie, è fantastico che {{formal}}Lei{{elseformal}}tu{{endformal}} faccia tutto autonomamente.</p>

4.2.1.5.6. Ricordare le chiamate Skype

Turn	DP	Text				
	Sys	Ciao qui è \$astro\$. Sono le \$time\$. \$Persona\$ aspetta la {{formal}}Sua{{elseformal}}tua{{endformal}} telefonata come ogni \$giorno\$. Devo fare i numeri per {{formal}}Lei{{elseformal}}te{{endformal}}? Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.				
	User	Si				
	Sys	<table border="1"> <thead> <tr> <th>Si</th> <th>No</th> </tr> </thead> <tbody> <tr> <td> Variabile casuale versione 1: Allora, cercherò di raggiungere \$Persona\$. {{formal}}Abbia{{elseformal}}Abbi{{endformal}} un po` di pazienza. Variabile casuale versione 2: Allora chiamo adesso \$Persona\$. Per favore {{formal}}Abbia{{elseformal}}Abbi{{endformal}} un po` di pazienza. </td> <td> Variabile casuale versione 1: Non {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare con \$Persona\$. Glielo dirò subito. Variabile casuale versione 2: Capisco. Non {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare oggi con \$Persona\$. Glielo dirò subito. </td> </tr> </tbody> </table>	Si	No	Variabile casuale versione 1: Allora, cercherò di raggiungere \$Persona\$. {{formal}}Abbia{{elseformal}}Abbi{{endformal}} un po` di pazienza. Variabile casuale versione 2: Allora chiamo adesso \$Persona\$. Per favore {{formal}}Abbia{{elseformal}}Abbi{{endformal}} un po` di pazienza.	Variabile casuale versione 1: Non {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare con \$Persona\$. Glielo dirò subito. Variabile casuale versione 2: Capisco. Non {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare oggi con \$Persona\$. Glielo dirò subito.
Si	No					
Variabile casuale versione 1: Allora, cercherò di raggiungere \$Persona\$. {{formal}}Abbia{{elseformal}}Abbi{{endformal}} un po` di pazienza. Variabile casuale versione 2: Allora chiamo adesso \$Persona\$. Per favore {{formal}}Abbia{{elseformal}}Abbi{{endformal}} un po` di pazienza.	Variabile casuale versione 1: Non {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare con \$Persona\$. Glielo dirò subito. Variabile casuale versione 2: Capisco. Non {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare oggi con \$Persona\$. Glielo dirò subito.					

4.2.1.5.7. Prendere una chiamata skype

Turn	DP	Text				
	Sys	Ciao qui è \$astro\$. Sono le \$time\$. \$Persona\$ chiama! {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare con \$Persona\$. Per favore {{formal}}risponda{{elseformal}}rispondi{{endformal}} con Sì o NO.				
	User	Si				
	Sys	<table border="1"> <thead> <tr> <th>Si</th> <th>No</th> </tr> </thead> <tbody> <tr> <td>Il sistema stabilisce la connessione</td> <td> Variabile casuale versione 1: Non {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare con \$Persona\$. Lo dirò subito a \$Persona\$. Variabile casuale versione 2: </td> </tr> </tbody> </table>	Si	No	Il sistema stabilisce la connessione	Variabile casuale versione 1: Non {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare con \$Persona\$. Lo dirò subito a \$Persona\$. Variabile casuale versione 2:
Si	No					
Il sistema stabilisce la connessione	Variabile casuale versione 1: Non {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare con \$Persona\$. Lo dirò subito a \$Persona\$. Variabile casuale versione 2:					

			Capisco. Non {{formal}}Vuole{{elseformal}}Vuoi{{endformal}} parlare con \$Persona\$. Lo dirò subito a \$Persona\$
--	--	--	--

4.2.1.6. Ricordi senza richiesta di una conferma

4.2.1.6.1. Ricordare eventi (appuntamenti generali)

Turn	DP	Text
	Sys	<p>Variabile casuale versione 1: Ciao qui è \$astro\$. Sono le \$time\$. Vorrei ricordar{{formal}}Le{{elseformal}}ti{{endformal}} che fra 15 minuti inizia l'allenamento per la mente nella sala \$sala di manifestazione\$. La signora \$infermiera\$ è lieta di salutar{{formal}}la{{elseformal}}ti{{endformal}}</p> <p>Variabile casuale versione 2: Ciao qui è \$astro\$. Sono le \$time\$. Ciao, Vorrei ricordar{{formal}}Le{{elseformal}}ti{{endformal}} che fra 15 minuti inizia l'allenamento per la mente nella sala \$sala di manifestazione\$. La signora \$infermiera\$ è lieta di salutar{{formal}}la{{elseformal}}ti{{endformal}}.</p> <p>Variabile casuale versione 3: Ciao qui è \$astro\$. Sono le \$time\$. Ciao , l'allenamento della mente inizia fra 10 minuti nella sala \$ sala di manifestazione \$. La signora \$ infermiera \$ è lieta della {{formal}}Sua{{elseformal}}tua{{endformal}} visita.</p>

4.2.1.6.2. Appuntamenti personali

Turn	DP	Text
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Sys	<p>Ciao, sono \$astro\$.</p> <p>Sono le \$time\$.</p> <p>Vorrei ricordar{{formal}}Le{{elseformal}}ti{{endformal}} gli appuntamenti d'oggi.</p> <p>Alle 10 inizia l'allenamento della memoria nella sala 12</p> <p>Alle 11.30 {{formal}}ha{{elseformal}}hai{{endformal}} l'appuntamento dal medico.</p> <p>Alle 15 viene Maria a visitar{{formal}}La{{elseformal}}ti{{endformal}}</p> <p>Anche importante:</p> <p>Domani è il compleanno di {{formal}}Suo{{elseformal}}tuo{{endformal}} figlio Hans.</p> <p>La prossima settimana è il compleanno di {{formal}}Sua{{elseformal}}tua{{endformal}} nipote Tanja.</p> <p>{{formal}}Le{{elseformal}}Ti{{endformal}} auguro una buona giornata</p>
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5. Development of scenarios

5.1. Framework for speech commands and touch control:

A prototype of a framework based on the open source multimedia platform XBMC including a graphical solution as a base for the touch screen interface is developed, combining the graphical solutions with the options of voice and touch commands. We filled this prototype for testing with multimedia and communication functions like music, TV, videos, internet, Skype and calendar. The graphical design was controlled from optical experts to make it ready to use too from elder people with visual impairments. Based on this development we can adapt this platform to fulfil specific tasks of the ASTROMOBILE project.

The functionality of this scenario you can see int the following video

http://www.youtube.com/watch?v=35tyZntA9j4&feature=mfu_in_order&list=UL



The function of the television which we probably don't need in the ASTROMOBILE project we changed in a button to control the robot. This scenario was developed for elder people and it would be necessary to complement it with special needs of the ASTROMOBILE project.

The team of the SSSA will be make usability tests with elder people to adapt the design and functionality to the special needs of elder people. It's important that this design was approved from optometrists especially the yellow background is important for the contrast for people with problems with the vision.

Maybe it's necessary to reduce the number of buttons to only four buttons to make it visible on the small screen of the robot.

The colour constancy should be defined as:

- Black letters: Information
- Blue letters: Speech commands
- The indication of touchscreen commands it's necessary to change in a better form to make it better visible for elder people

5.2. Detailed definition of the scenarios

In the discussion and with the knowledge about the existing and developed possibilities we convened with our partners to try to develop within this project the following scenarios

User - Robot:

From the proposed scenarios from the XBMC platform we can use in the ASTROMOBILE project the following scenarios and offers for the user, when the robot stays in front of the User after calling him:

- weather
- news based on RSS feeds maybe with speech synthesis to read the news
- **Multimedia** offers like:
 - Photos
 - Music
 - Videos
- **Communication** offers like Skype calls
- **Organization** offers: scheduler

To complement the actually existing offers and services it's necessary to think about the following services

- **Control functions** in the natural environment ordered by the user and configured feedback by the

robot using the recording of a 10 second video and presenting it to the user, when the robot comes back like

- Control of the water in the bathroom
- Control of the doors in the environment
- Control of the cooker
- Control of the gas and other critical functions
- **Request functions:** With the help of the XBMC platform the user should be able to initiate some requests like
 - **Request of new medicine**
 - **Request of food**
 - **Request of acute help**
 - **Request of general help by the caregiver**
 - **Request of caregiver transport to the doctor or other events**
 - **Pre-established SMS-Service with the list PlugIn**

Robot - User:

- **Reminder functions with request of help** are prepared for the following situations like
 - Alarm in the morning
 - Reminding of the hygiene and dressing in the morning
 - Reminding of the hygiene and facing in the evening
 - Reminding of taking the ordered drugs
 - Reminding of periodic drinking
 - Reminding of eating in the morning
 - Reminding of eating in the noontime
 - Reminding of eating in the evening
 - Reminding of coffee time
 - Reminding of periodic Skype calls
- **Simple reminder functions** without request of help are prepared for the following situations like:
 - Reminding of events (Based on calendar)
 - Reminding of birthdays
 - Reminding of appointments like
 - Meeting with friends
 - Consultation with doctors
 - Visit of events
 - Personal appointments in the calendar
- **Dialogue-actions: (skype and mailing) (simple reaccion yes or no!)**
 - Incoming Skype calls with the possibility to accept or refuse the call

- Incoming mails with the possibility to allow or refuse that the robot reads the message
- Incoming appointment requests with the possibility to allow or refuse the appointment

Caregiver – robot – user

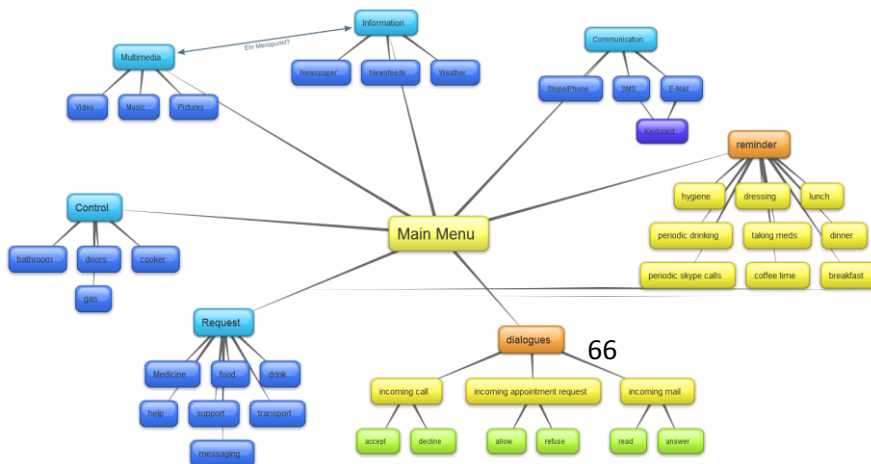
- Control functions:
 - Caregiver have access to the information of the sensors in the environment
 - Caregiver can administrate the dialogues, appointments and reminder functions for the user on the calendar
 - Caregiver can activate the robot to transmit a visual impression of the user in case of emergency
- Communication functions
 - Caregiver can call the user using the Skype dialogue
 - Caregiver can sent an appointment to convene with the user using the robot and the calendar
 - Caregiver can sent an information with E-Mail using the mail reading dialogue

Optional function requirements:

Access to a useful keyboard and calculator for the user – simon keyboard or dasher scenario with touchscreen handling

5.3. Adaption of the framework to the defined scenarios in the last work session

Based on the state of the development from the last work session in Pisa we convened the scenarios which we will develop, so we have to change the framework, which is actually concentrated to information and communications tools to



which we will develop, so we have to change the framework, which is actually concentrated to information and communications tools to

a adapted framework to manage the specific Astromobile scenarios, and to adapt the framework to the small monitor of the robot. For that reason we decided to reduce the number of buttons from 8 to 4 buttons and discussed the command structure to develop an adapted command structure for the Astromobile project based on the convened scenarios. In the following graphics you can see the different functions. The blue part is important for the command structure and the yellow groups are running in the background of the software.

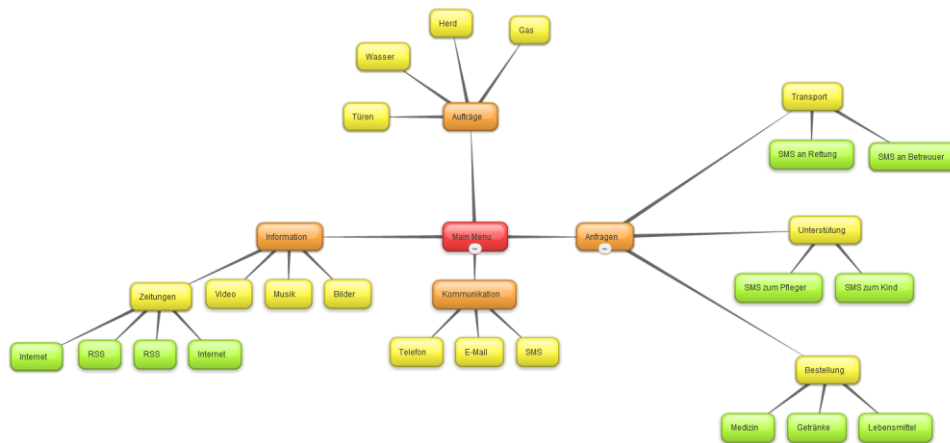
Beginning of the detailed definition of the scenarios to make a checklist of the different technical aspects of the different groups of scenarios from the point of technical view

This is an important part of the work to control and define the following aspects of the project:

- a. Command structure
- b. Development of different functions (mail client, messaging system, video streaming etc.)
- c. Control of the wordlists for the speech models
- d. Development of the detailed simon scenarios
- e. Definition of the path planning of the robot
- f. Definition of the functions, which has to fulfill the software of the robot

New command structure

Based on the groups of functions we developed the following command structure for the ASTROMOBILE project, reducing the number of buttons to four pieces motivated by the small monitor of Astro.



On the Mockups actually we are working, so we can only present one abstract but this isn't the final!



6. Programming

6.1. Programming the D-Bus interface between simon and the robot platform

Drafting Architecture of AstroMobile

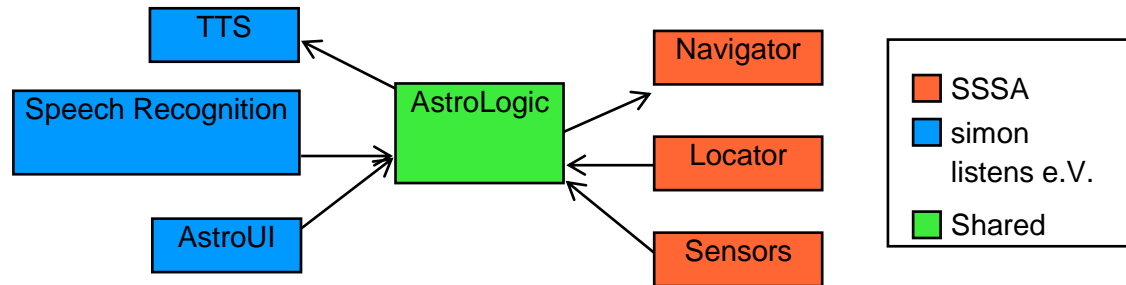
The technical leads of the SSSA team, Filippo Cavallo and Manuele Bonaccorsi and I met to discuss the modularization of the proposed Astromobile platform. In order to streamline the development efforts, we decided on a highly modularized system with high level components.

The current draft identifies seven dedicated components:

- Navigator: Provides high level navigation including obstacle avoidance and path planning
- Locator: Locate the robot and the person using the sensory network
- Sensors: Integration of boolean sensors (bed sensor, smoke sensor, etc.)
- Speech Recognition: Command and control system utilizing simon
- Text-To-Speech: Synthesize a given text in German, Italian and English
- AstroLogic: Logic layer

- AstroUI: Graphical interface to the robot

Figure 1: Conceptual architecture



The individual components communicate over D-Bus.

The Astrologic layer will manage the Navigator, Locator, Sensors and TTS components and provide a very high level interface embodying Astros actions defined in the scenarios. Those functions will be called from both the Voice Recognition part and the AstroUI.

Status information (sensors, etc.) are to be relayed by using D-Bus signals.

Moving the Robot Platform to Ubuntu 10.10

The stock SCITOS G5 platform was based on Fedora 12. This version of the Fedora system sadly does not provide a number of crucial libraries in a recent enough version to run simon or it's dependencies. To incorporate the speech recognition and TTS technology, the platform needed to be migrated to a more current GNU/Linux distribution.

Because support of the MetraLabs platform for Fedora 14 was still not finalized, we decided to set up Ubuntu 10.10 on the robot.

The original image of the system was preserved (cloned) before the primary partition was reformatted using the ext4 file system. After a clean Ubuntu installation, the software stack was restored one-by-one. To get the MetraLabs system to function properly, some dependencies needed to be compiled manually (e.g. opencv 1.0, etc.).

As a list of dependencies and their exact required version was not available, the trial-and-error process proved to be quite time consuming.

Setting Up the Principal Architecture based on D-Bus

To both test the basic design and show off the power of the modular, D-Bus based approach, a demo infrastructure was created.

All the above mentioned components were created (largely using dummy data and containing no real algorithms) and the IPC connections were set up.

The Navigator utilized the MetraLabs platform to export the fully functional methods `move Forward()`, `move Backward()`, `turn Left()` and `turn Right()` over D-Bus (to later be replaced by the already existing but not yet implemented higher level `go to(x,y)` method).

The Sensors and Locator modules sent dummy data, but the Interface and the high level connections were already created and are also fully operational.

The Astrologic component already connects to its child modules (see graphic above) and listens to their respective signals (Sensors, Locator). For now, only debug output is produced when such an event occurs (received new location from the Locator, for example).

The logic module itself exports a high level function called `go to kitchen()`, which – for now – tells the Navigator to move the robot forward and then backward again using the methods mentioned above and outputs „Going to the kitchen“ through the TTS system.

Astrologic also re-emits the location signal received from the Locator.

The created UI connects to the logic layer and provides a button to initiate the `go to kitchen ()` action. It also displays the current location information emitted by Astrologic.

The simon speech recognition layer has been configured to listen to „Come to the kitchen“ and „Go to the kitchen“ which also calls the appropriate function in Astrologic.

Creating English Demonstration

To further showcase the capabilities of the simon speech recognition solution and the level of maturity the graphical touchscreen interface already reached, we set up a basic demonstration environment using a static, English base model from Voxforge.

The simon-demo configuration allows the user to browse through most of the graphical interface by voice and also allows direct control of the robot with the voice commands „Move forward“, „Move backward“, „Turn left“ and „Turn right“ which call the associated methods in the Navigator module.

Deciding on Source Control and Licenses

After a short meeting, the license to be used for the Astromobile was selected to be the revised BSD license (3 clauses).

To keep the organizational overhead as low as possible we decided to employ the Git revision control system to manage the source code. A public git repository was created on GitHub.com and the already created prototype was uploaded.



The results of the work you can see in the documentation video to download under:

<http://www.youtube.com/watch?v=18J5qOFmNIM&feature=related>

6.2. Simon - ASTROMOBILE – new developments

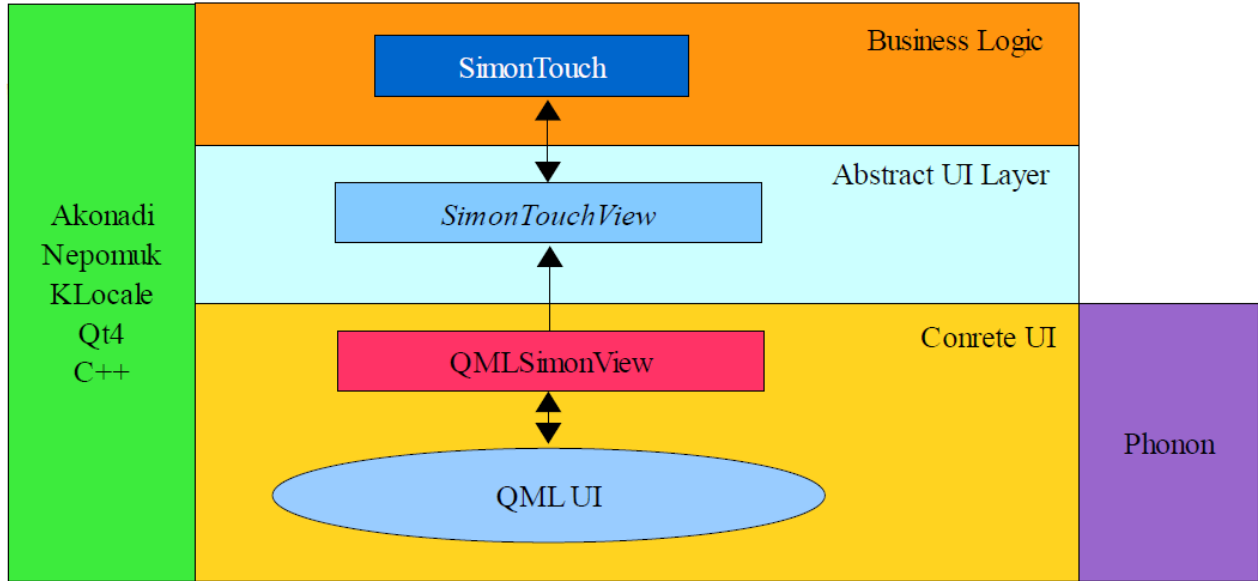
For the implementation of the functionalities of the project Astromobile, some parts of the software simon has been developed completely new.

Simontouch Development

6.2.1.1. Astromobile Report: Simontouch

In addition to the voice control, the robot used in the Astromobile project employs a touchscreen to communicate with the user.

Mindful of our target user group and the diverse yet specific use cases, we decided to develop a custom user interface instead of extending existing kiosk software. The resulting application is called „Simontouch“.



6.2.1.2. Architecture

Like the rest of the developed solution, Simontouch uses C++, Qt4 and the KDE libraries. In particular, we are using the Akonadi PIM service, the Nepomuk / Strigi search, the KLocale framework for localization and the Phonon multimedia system.

To build a touch friendly, visually appealing UI, we decided to design the graphical user interface using Qts declarative UI called QML („Qt Meta Language“).

This enabled us to keep the user interface separate from the business layer to such an extend that we decided to split the implementation effort: One person whose background in web development enabled him to pick up QML and it's Javascript elements quickly was to design the user interface while another one built the business layer. A narrow, high level interface between the two components was defined in a joint meeting at the beginning of the implementation period.

6.2.1.3. Interface

To keep the overall interface clean and simple we grouped the available features into four high level cagegories:

- Information: News and multimedia content
- Communication: Keeping in touch with family and friends
- Check: Order the roboter to check on the environment
- Request: Put in requests to an external care giver or confidant



Each menu may offer submenus. However, all menus are restricted to display at most four options.

For maximal contrast a black-on-yellow color scheme is employed that provides optimal readability with minimal eye strain.

The voice control may sometimes use numbers instead of option names to drill down sub-menus to reduce the recognition vocabulary (increasing accuracy).

6.2.1.4. Common Elements

Three features are available in every module and are thus located in a row of buttons at the bottom of the screen. These options are (in order):

1. Calculator
2. Keyboard
3. Calendar

More information about the keyboard and calculator can be found in the „Communication“ section.

Pressing on the calendar icon displays a full screen overview of the calendar entries of the current day. The user can navigate through the calendar using either voice commands or the touchscreen controls.



Multi-microphone architecture

One requirement that has been a result of our scientific consultancy was the support of the simultaneous recordings with several recording devices.

For the reason that some of the proposed scenarios cannot run with headsets, other microphones (gooseneck microphones, hanging microphones, etc.) will be used, so the recognition will work with them. Speech models cover the best situation with which they were trained. Thus, the detection rate increases substantially when these models are also trained with goose neck and hanging microphones.

So that the necessary record time was not tripled, a system was developed that records synchronic with multiple microphones.

This multi-microphone architecture has been implemented to benefit all applications in the simon composite (ssc, simon, sam). By implementing in a library now not only records SSC with multiple microphones, but also simon. Further, Simon now also supports voice recognition with more than one microphone at the same time. This is very important too for the planned tests of signal processing with different speech models and an installation of microphones in the natural environment.

speechcal

Speechcal is a small voice-controlled calendar application, and allows the user to browse through his calendar with only three voice commands.



With „up" and "down" the application switches between the days. The current day is selected automatically at startup.

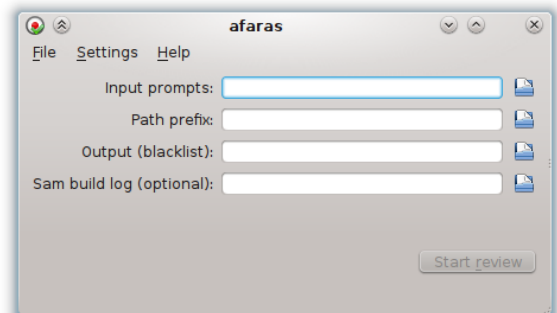
simonoid

For the control of the recording level we developed a little tool called "simonoid". It shows the average level of all connected microphones.

afaras

To remove efficiently low quality recordings from data sets collected with ssc, we developed another small tool to make easier this process

With afaras (automatically find and remove amiss samples), bad recordings can be marked with a single



keystroke. Then they can be automatically removed before the model building.

simonskype

With simonskype we created a bridge between the simon infrastructure and the voice over IP solution Skype. Simon Skype offers two basic functions:

1. Call set-up with contacts over calling a command line tool
2. Integration in simons dialogue system for opening dialogues with incoming calls. With these dialogues, the call can be accepted or rejected.

simonstatus

With simonoid we already created a tool to inform the user about the recording situation. In addition to the actual microphone recording level from the current filter state ("simon sleep" / "simon wake up") it is very relevant for the functionality of the system, to represent the activation status graphically.

In addition to the graphical state activity it also displayed the voice command with which this state can be changed.



6.3. The dialogue system of simon

For the scheduled interactive reminder function we required the possibility to perform proactive dialogues with the user. The "dialogues" shall support several paths, which get selected from the user with different answers.

The dialogue system of simon was implemented as a command plugin. You can basically speak of an ultimately robot.

Every dialogue basically consists of some core components.

States

Every state consists internal of:

Text

The current dialogue text. Every State can have several texts to give the dialogue a natural flow. Dialogue texts can use bounded values and templates (see below).

Avatar

A state can be linked with an avatar (e.g. the face of a nurse, an icon, etc.)

Options

Through triggering the options (e.g. by a speech-command) a state can go over into another or commands can be executed. Options have a trigger, a name, an optional icon and can be automatically initiated after some time from entering the state.

Bonded values

Variables in the dialogue system will be shown as bonded values. So for example the name of the user could be represented as \$name\$. The variable will be triggered to the duration with the list of configured bound values. There are four types of bound values:

Static

Connection of the variables with a text; e.g. Name of a patient

QtScript

This variable takes the result of the given Qt-Script (ECMAScript; also known as "JavaScript") at the evaluated run time.

Command Argument

If the dialogue is invoked with command line parameters (through simons parameter system for commands), the values can be accessed with this type of bound values.

e.g.: simon skype consigns the name of the caller to the given dialogue through a command argument.

Plasma data engine

The value of the variable is equivalent to the value of the attribute of the given plasma data engine.

e.g.: simple time of day, weather, etc.

Template options

Alternative text varieties can be implemented in dialogue texts to be selected appropriate to a template option.

So for example a formal and an informal verbalization can be used and a template option chooses during run time between them.

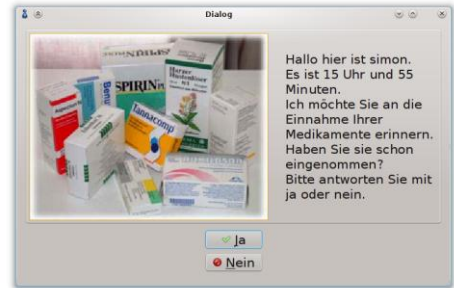
Output options

A dialogue can be shown graphically on the screen or through the integrated speech synthesis system (TTS) with the speaker. The TTS system can use following types of synthesis:

- Speech dispatcher through Jovie
- Random web services with WAV-return (for example "OpenMARY")
- A previously recorded set of WAV-recordings for concrete dialogues (can be imported / exported)

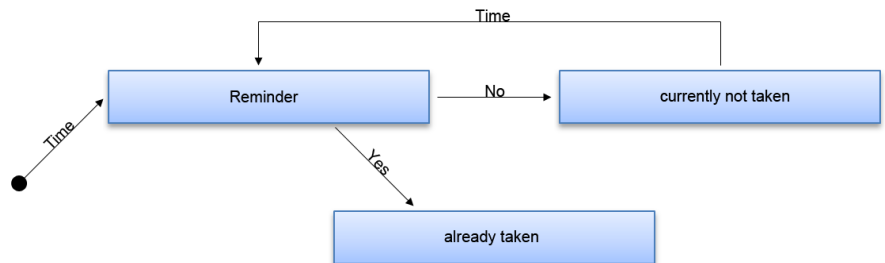
Dialogues in the Astromobile project

A variety of dialogues were planned in the ASTROMOBILE project. In this chapter you can still find a description of the simon dialogue system based on a complicated dialogue: the periodic drug reminder. The detailed dialogue specifications you can find under point 4 of this document



6.3.1.1. Dialogue activities

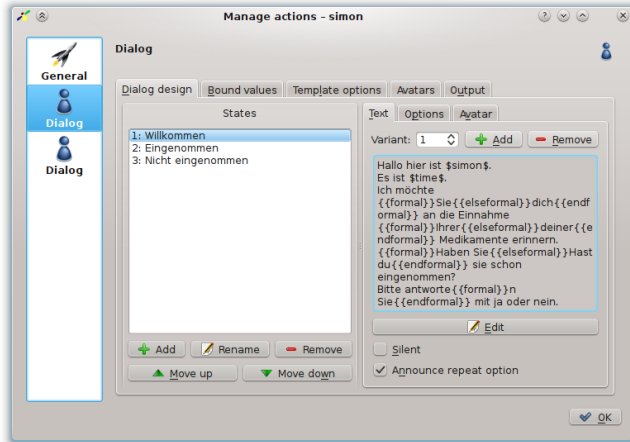
To certain times ASTRO should remind the user to take his drugs. The user will be asked if it is done already. If he answers "no", the system shall remind him in a gap of a few minutes until he has taken the drugs.



6.3.1.2. Implementation in simon

The dialogue states can be taken through the schematic diagram above. So it results in:

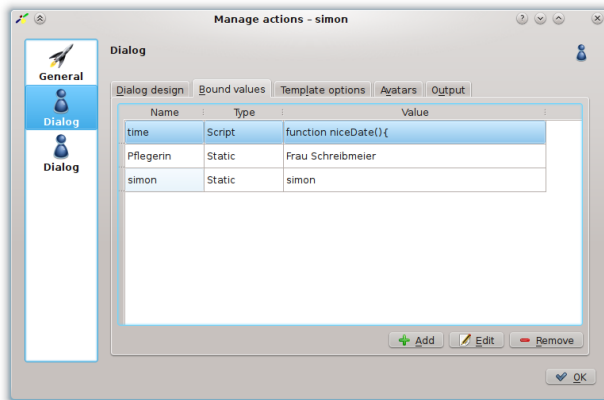
- Three states (Reminder, already taken or not taken)
- One time-driven trigger (who starts the dialogue on a specific time)
- 2 speech transitions ("Yes", "No")
- One time-driven transition (renewed reminder after time lapse)



6.3.1.3. States

The three states can be applied directly as such. The text was kept variable by the help of the template system and with bound values parameterized.

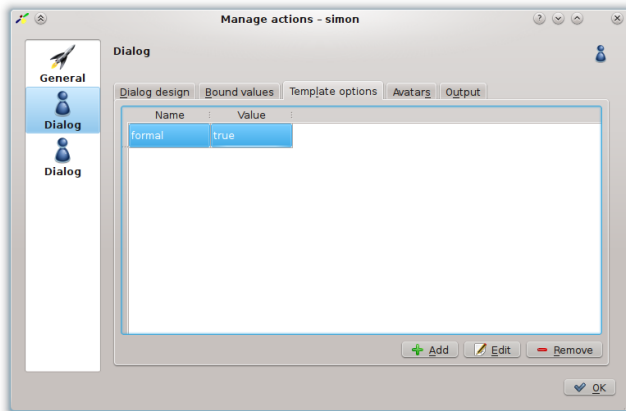
So the name of the system was applied as a static variable ($\$Astro\$\$) to make it easier to adjust later. So, for example, it would be thinkable to record own voice output texts from a nurse and to replace “Astro” with the corresponding name.



The time was calculated through QtScript integration by use of a JavaScript snippet. (e.g. “8 o’clock and 20 minutes)

```
function niceDate()
{
var currentTime = new Date();
var hours = currentTime.getHours();
```

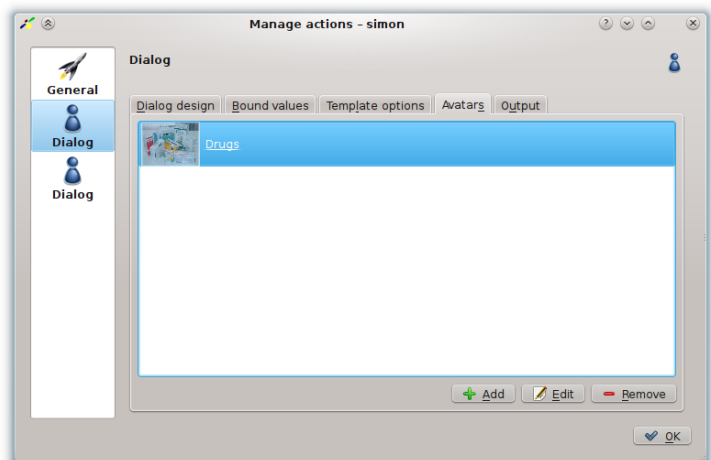
```
var minutes = currentTime.getMinutes();  
var output = hours + " Uhr";  
if (minutes > 0)  
output = output + " und " + minutes + " Minuten";  
return output;  
}  
niceDate();
```



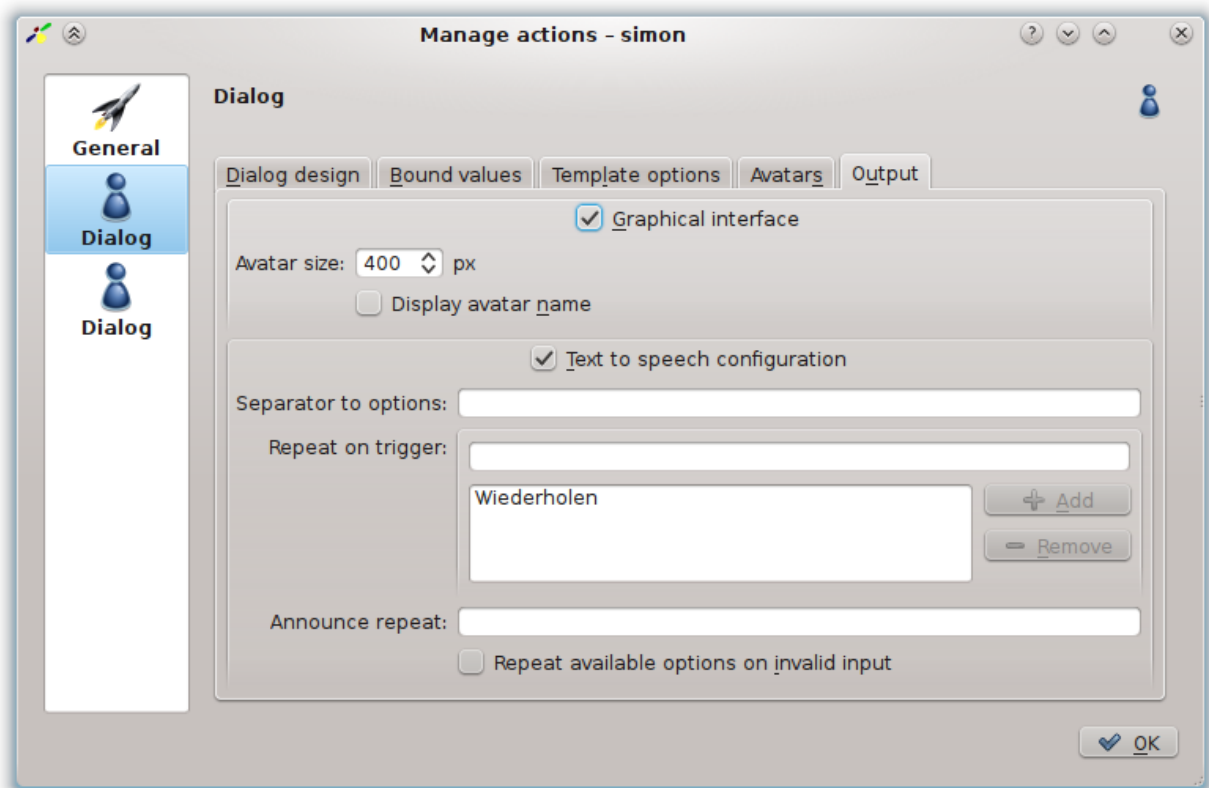
Several texts were assigned to the states. On initiation of the dialogue, one text of all texts will be selected and displayed to make it less monotonous.

The template system was used by means of parameters to display the dialogues either formally or informally. For that to happen, the value of the corresponding template parameter needs to be adjusted.

An icon configured as avatar will be displayed in addition to the text.



An audio response system (in our case through the web service provider and a local OpenMARY instance) and graphic interface will be used for the output.

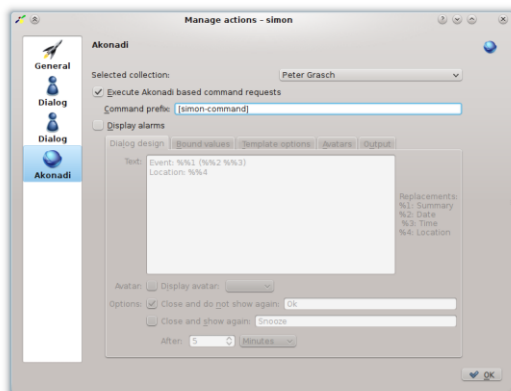


6.3.1.4. Trigger

The dialogue shall be started at a specific time. For that we use calendar integration with the Akonadiplugin.

Simon commands can be triggered time-controlled through the Akonadiplugins.

The “drug” dialogue can be initiated through the calendar entry with the title “[simon-command] dialogue/Drugs” using the mentioned configuration.



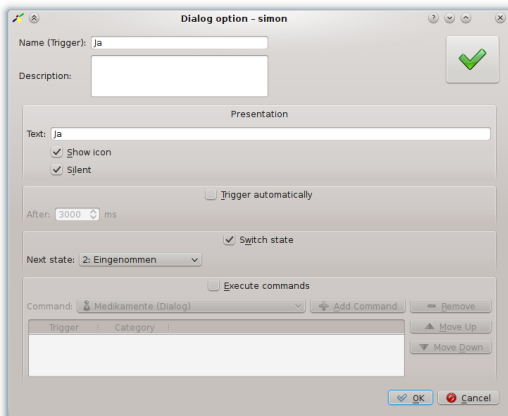
Iteratives events will be supported and can be used for daily reminder.

6.3.1.5. Options

Switch among the states through the options.

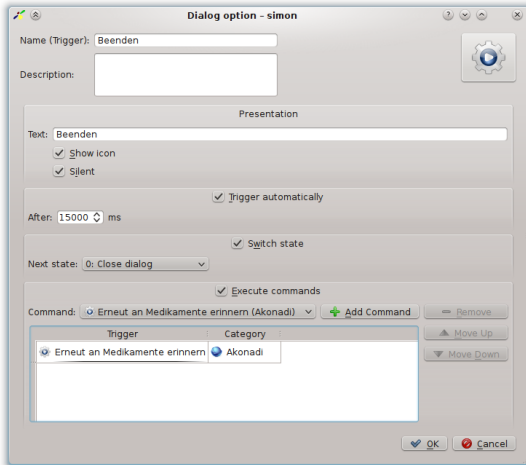
In the first state (the reminder itself) the user will be asked, if he has already taken the drugs. As a result, he has two options:

- Yes: moves to the state “taken”
- No: moves to the state “not yet taken”

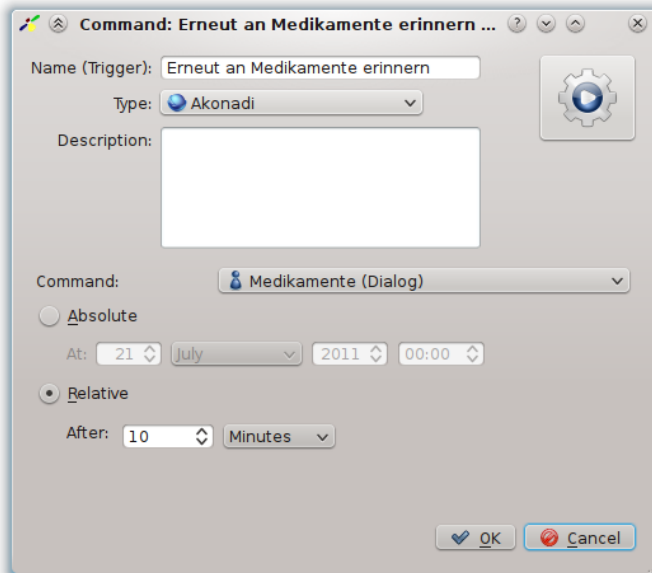


In the state “taken” exists just one option („end”) which will be automatically initiated after 7 seconds (after the dialogue text was spoken).

Even in the state “not yet taken” exists one similar option. If this will be triggered, an akonadi command will be initiated simultaneously which shall start the dialogue later again.



The akonadi command executes the dialogue after ten minutes again.



With these steps, the schematic displayed dialogue above was fully implemented in simon.

6.4. Simone – smart phone client

While drafting the project concept, we initially ruled out cable bound microphone solutions because they are just too complicated and cumbersome in practice. In fact, those arguments carry even more weight considering our target user group.

During our initial prototyping stage it soon became apparent that even wireless microphones posed problems. They were not designed to be used by consumers and therefore often focus on range or sound quality over price and usability. While those factors are of course also important for our intended application, they are not as important as reliability, weight and talk time on a single charge. Even As design plays a role when taking into account that the system needs to be accepted by elderly people.

As a result of this analysis, the simon team has started to also look into other options. While still evaluating various portable microphone solutions, we have started to develop a simond client for smartphones called *simone*.

Smartphones have become increasingly popular in the last couple of years. With that development they also became cheaper, more reliable and easier to use.

The current generation of smartphones sports good built-in microphones with advanced features like active noise cancellation and echo compensation and a variety of connectivity options ranging from Bluetooth and Wi-Fi to GSM and HSDPA. They also have comparatively good batteries and are sleek, light and easy to conceal. As such they provide an ideal platform for intelligent, autonomous simond clients that can not only transmit sound but also preprocess it efficiently to remove ambient noise and preserve bandwidth through voice activity detection.

Following this hypotheses, we developed simond clients for two smartphone platforms:

- MeeGo

A Linux based, open source operating system targeting a wide variety of devices including Handsets, Tablets and IVI systems (In-Vehicle Infotainment).

- Android

Also Linux based and open source; Supports Handsets and Tablets.

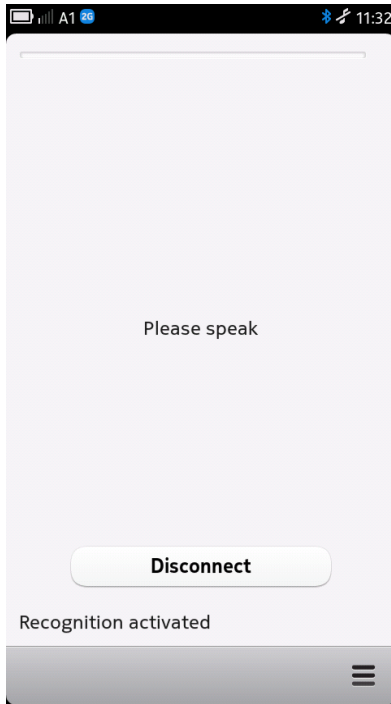
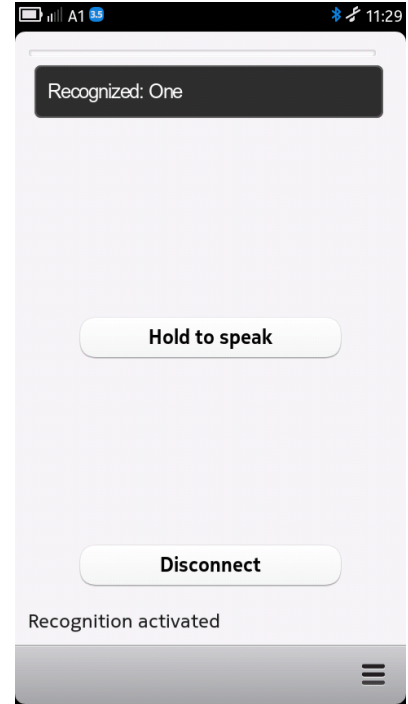
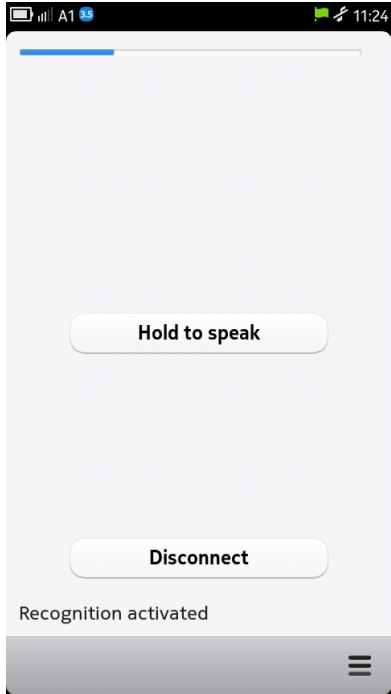
Because the Android version of *simone* is still under heavy development, the rest of the report will mainly focus on the MeeGo client. It is planned that the Android version will have reached feature-parity with the MeeGo version upon release.

simone for MeeGo

The client was developed intended to be used both as part of the Astromobile solution and independently. It is going to be available for free in the Ovi Market right on the device to increase uptake and encourage speech donations and other improvements to the recognition system that would eventually benefit the developed Astromobile solution.

To enable users to use simone without setting up their own simond, we intend to provide a public recognition server that provides a small pre-defined speech model for a couple of actions that can be configured right in simone. Voice samples gathered through normal operation of simone could be used to extend and improve the speech models used for Astromobile.

The client uses the built-in microphone to record either permanently (with the same configurable voice activity detection as the desktop application; screenshot on the right) or at the push of a button (left and center). A loudness meter at the top informs the user that the system is listening. Recognition results will be displayed on the device for confirmation (center screenshot).

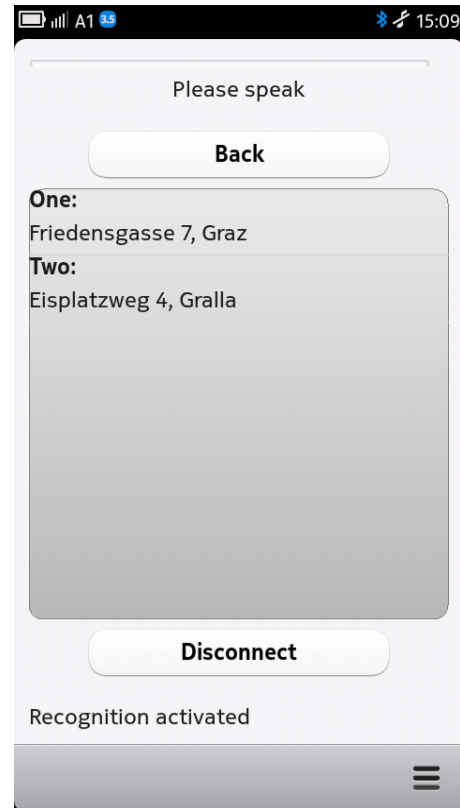
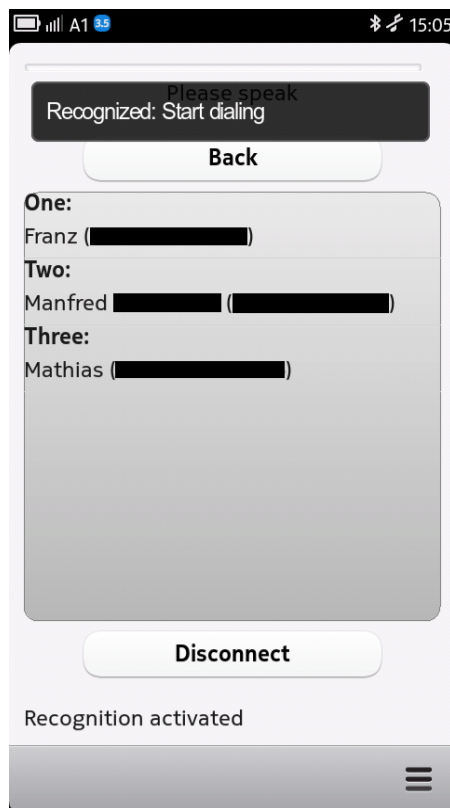


If the server is configured to do so, the recognition results will be passed to other connected clients with the same user name making the smartphone act much like a wireless microphone by default.

But the user can also activate features like voice dialing and voice based navigation giving him rudimentary control over the handset.

The following voice controlled options have been implemented:

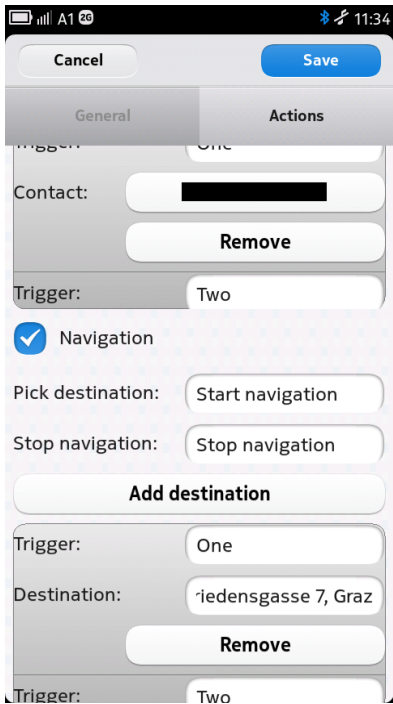
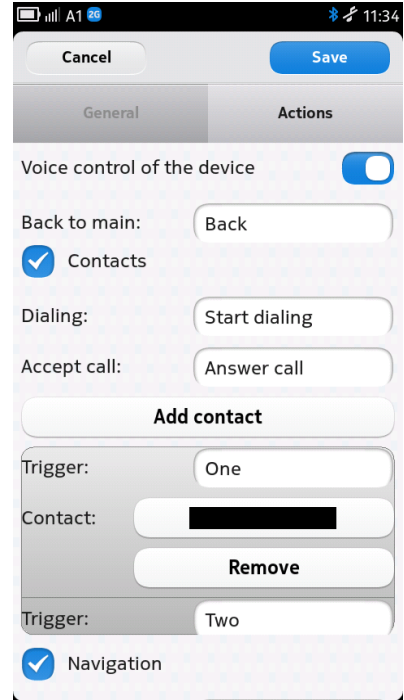
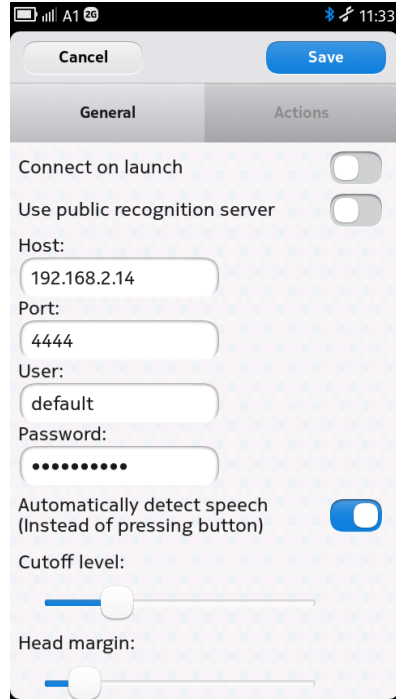
- Open dialing screen (left screenshot below)
- Quick dial one of the numbers from a user configurable list
- Abort dialing
- Answer an incoming call
- Open the navigation screen
- Start navigation to one of the displayed (user configurable) destinations (right screenshot below)
- Abort destination selection
- Stop active turn-by-turn navigation



As you can see, this example uses English words to control the device. However, these triggers can of course also be configured in the extensive configuration of simone.

In case of a private simond server, the user is able to pick the used triggers freely. This makes him responsible to make sure that the speech model running on the server has been configured (through, for example, simon) to allow the recognition of the used triggers.

When using the public simond server, the trigger selection fields turn into selection boxes allowing the user to choose from the words that are supported from the public server.



All device actions can be individually disabled.

simond Modifications

To allow for a public simond server without compromising security, additional features needed to be implemented.

simond now provides the option to limit write access to certain hosts.

Additionally, an “isolated mode” was added to address two different use cases for the server:

1. In private installations it makes sense to share recognition results between connected clients with the same user. For example, the user “Joe” might connect to the server both with his notebook and with his phone. He'd then expect to trigger actions on his notebook with his smartphone essentially just using it as a wireless microphone. Other users connected to the same server would not be affected.

2. On a public server, there might be different users for different languages or dialects. However, those users don't reflect physical persons. As such, it wouldn't be reasonable to expect that the recognition results of one person should affect other clients using the same logical account. Because one logical, simond user now represents more than one physical user of the system, the connections need to be treated individually and separately.

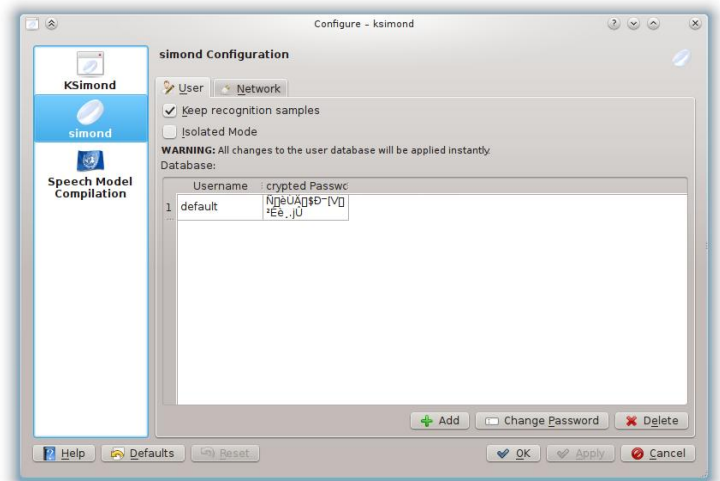
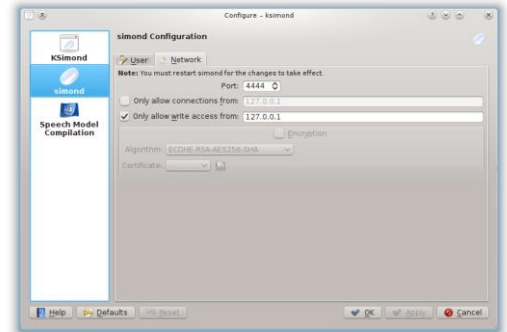
The “Isolated mode” option allows switching between these two behaviors.

Demovideos of the functionality you can find under:

<http://www.youtube.com/user/simonlistens#p/u/1/2AODZJPJFPM>

and the technical part under

<http://www.youtube.com/user/simonlistens#p/a/u/0/yfx8qRi6pYQ>



6.5. Usability Information

Users on Astro

English User:

Username: astro

Password: scitos

Italian User:

Username: astro_it

Password: scitos

German User:

Username: astro_de

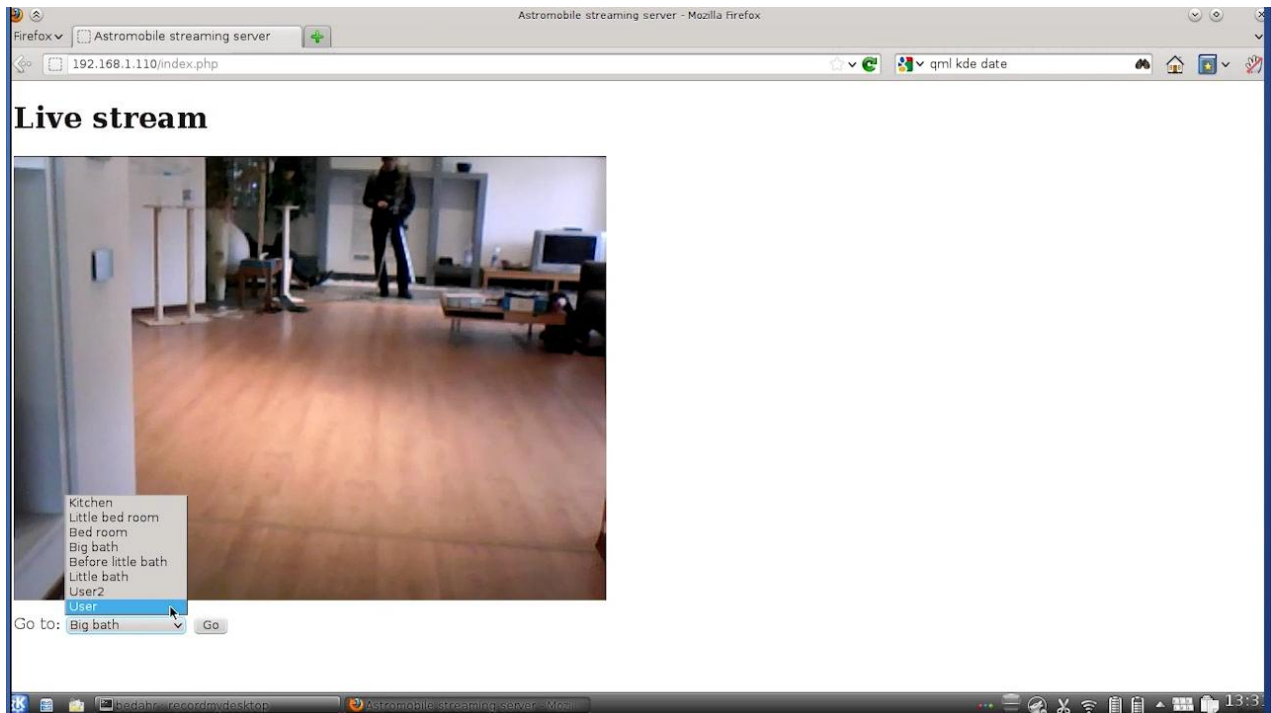
Password: scitos

Changing between languages

To change between languages you only have to log in with the specific username and password on the log-in screen.

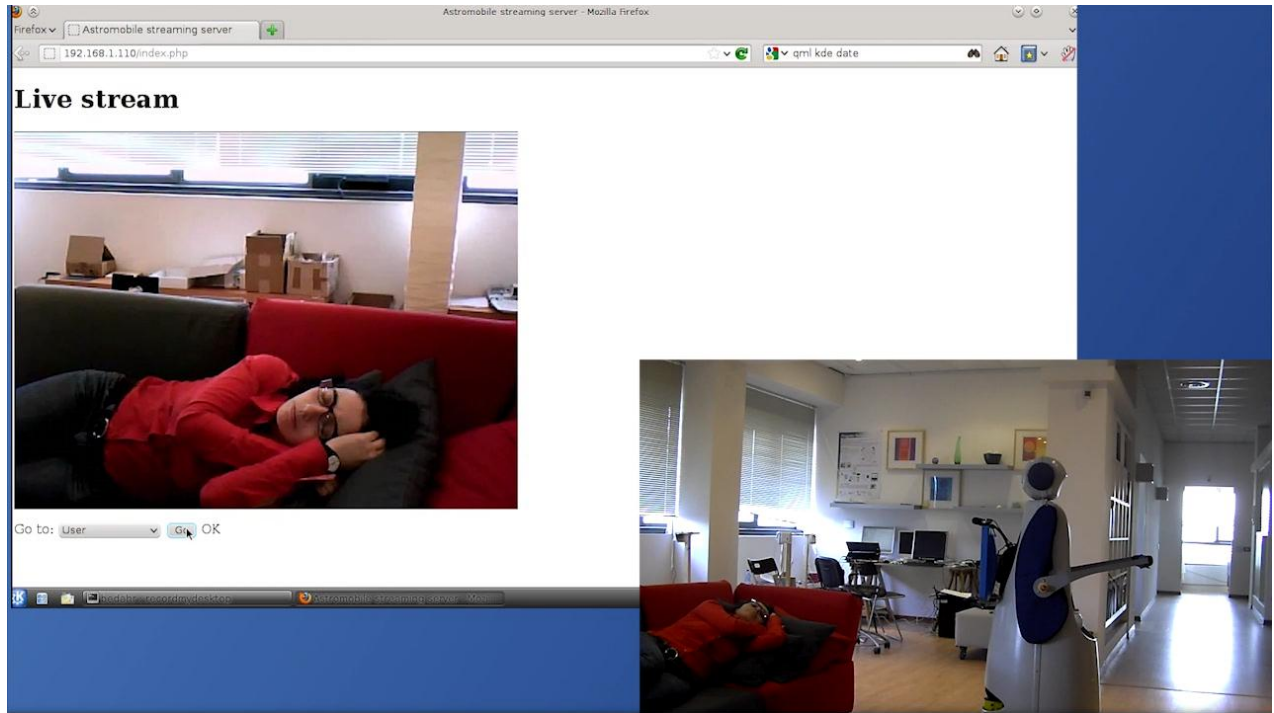
Web Interface

External caregivers and family members can access a specifically prepared webpage running on a server on the robot that displays a live video stream from the viewpoint of the robot and allows them to send the robot to specific points in the flat as well as directly to the monitored patient.



The front-mounted webcam provides a high quality, low latency video stream based on well standardized and widely used protocols (WMA1 audio with WMV1 video in an ASF container over MMS transmitted over HTTP).

AJAX is used to send navigational commands without disconnecting from the video stream.



Through careful protocol considerations, no additional plugins are required to be installed on a caregivers computer as long as running Windows XP or later (Internet Explorer 7 is required for sending navigation commands to the robot).


Chrome, Firefox and Opera on both Windows and Linux have all been tested successfully with the free VLC browser plugin.

6.5.1.1. Accessing the Web interface for the caregiver

To access the web interface for the caregiver you have to enter the IP-address of the robot into a web browser. This should open a webpage with an embedded video and a robot control below.

http://192.168.1.104/ Astromobile streaming server X

Live stream

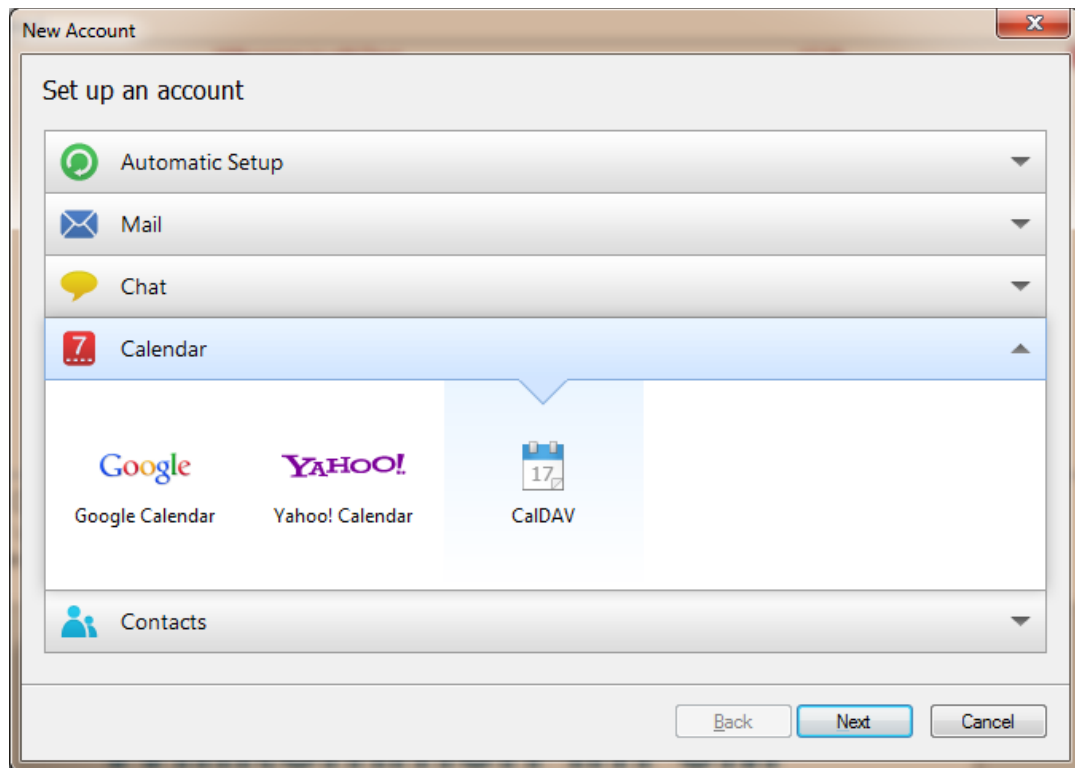


Go to:

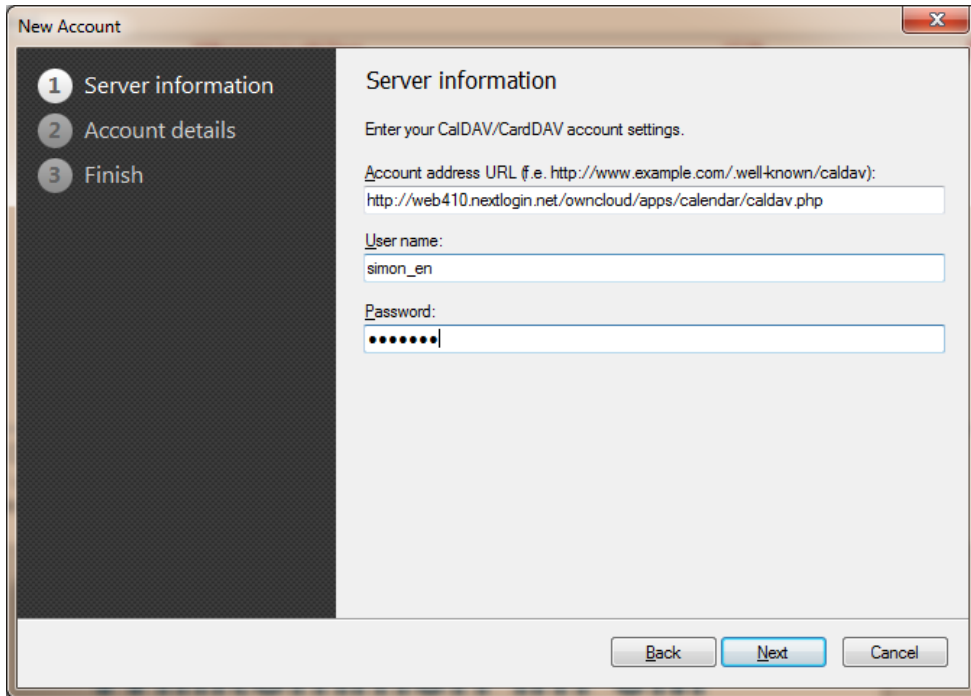
- Kitchen
- Little bed room
- Bed room
- Big bath
- Before little bath
- Little bath
- User

Installing and configuring software for Appointments for Windows

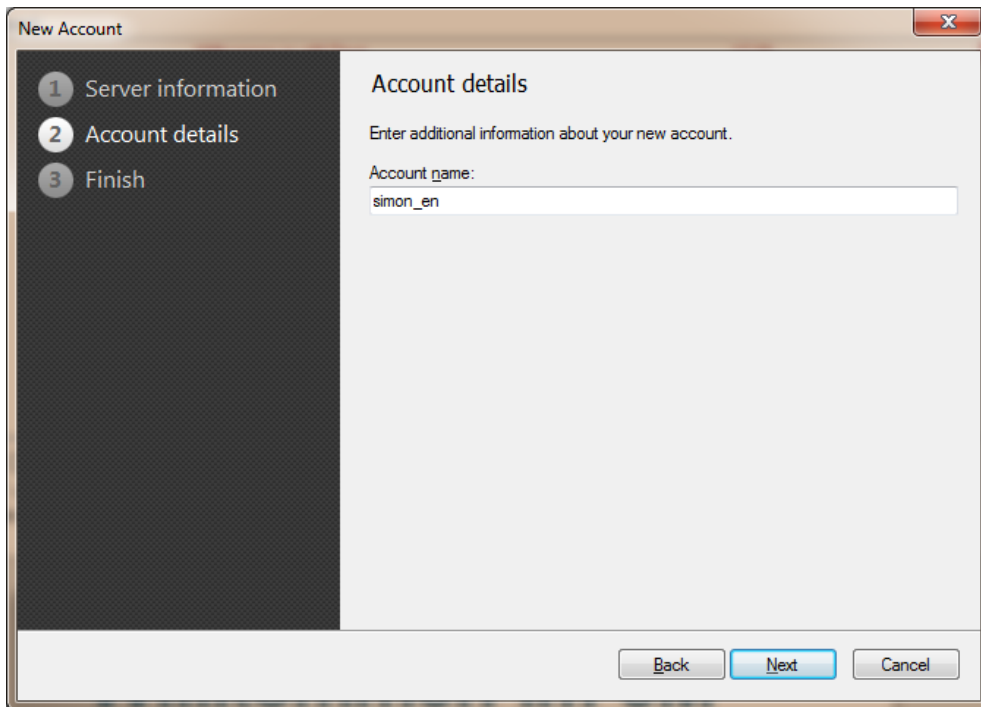
1. Download eM Client from www.emclient.com/download
2. Execute setup.msi for starting the application setup
3. Accept the license agreement and select “personal / non-commercial use”
4. Deselect “Install the eM Client toolbar” and hit “Install”
5. Now should the setup install eM Client on your computer
6. First you should see a Wizard to configure an account. There select “Calendar” and within “CalDAV”



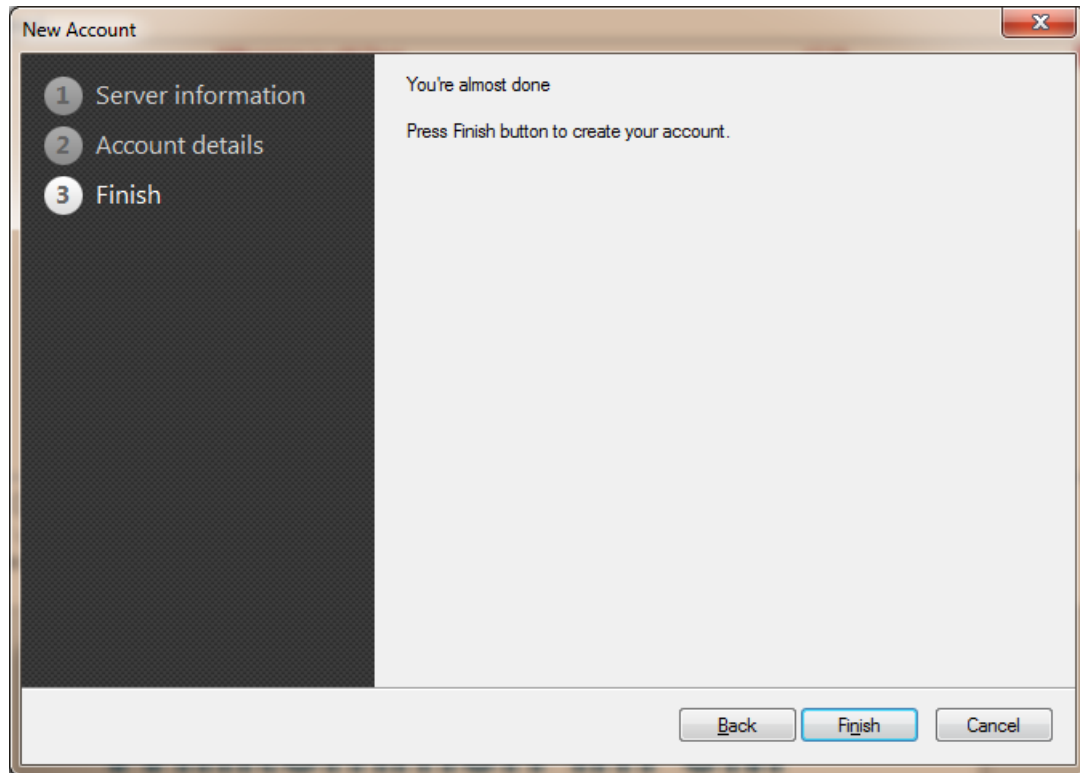
7. Hit “Next” and following dialog appears and fill in as adress: <http://web410.nextlogin.net/owncloud/apps/calendar/caldav.php> and the associated Username and Password.



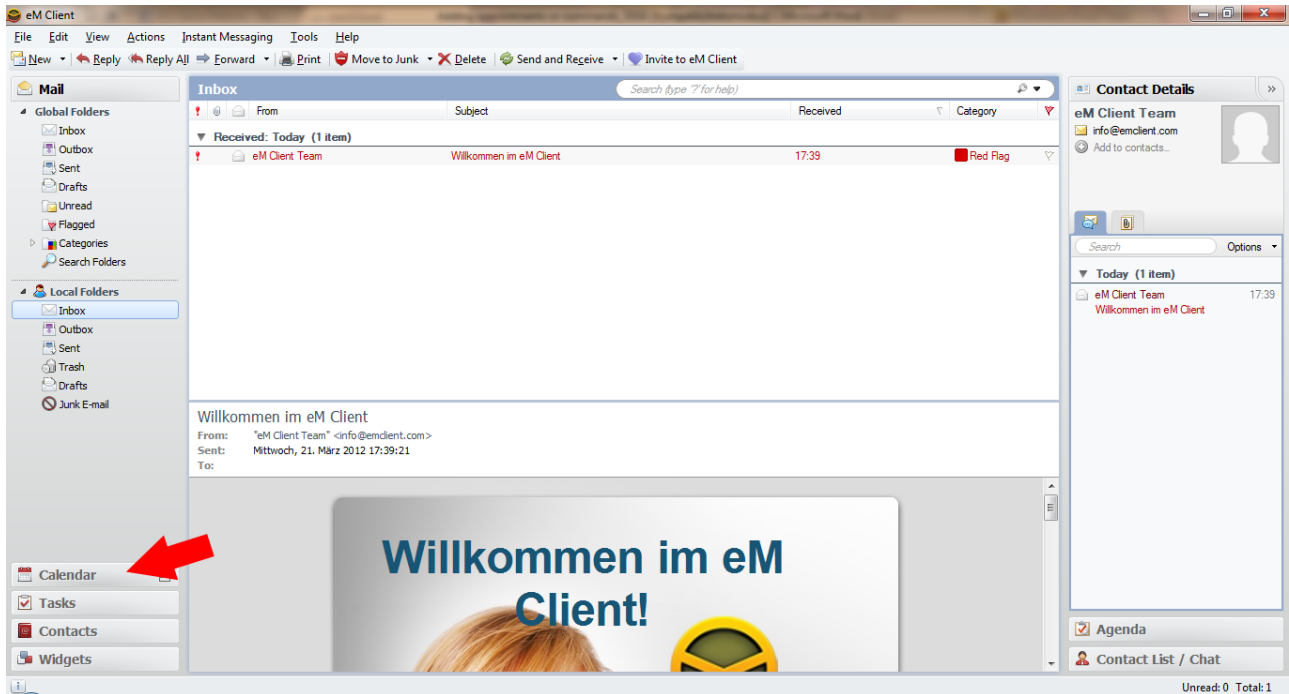
8. Hit "Next" and enter an arbitrary account name.



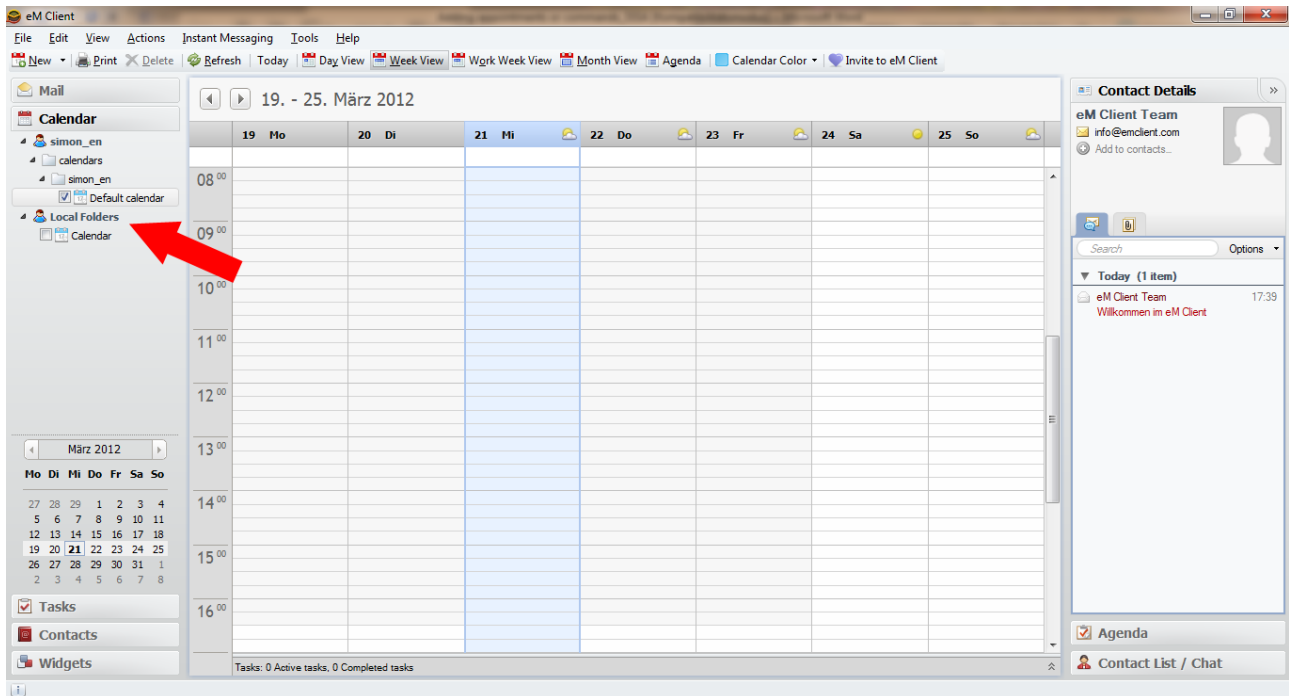
9. Finalize the setup by hitting finish.



10. Now click on "Calendar" in the lower left side.



11. Now select Default calendar and deselect the calendar from local folders



12. Now you can set up any events you want.

Adding appointments or commands

The prototype is configured to fetch appointments (and time triggered commands) from a CalDAV online resource installed on a server provided by simon listens.

To add new appointments or commands, the owncloud web interface can be used: <http://web410.nextlogin.net/owncloud>

There are three accounts available for the different users on the robot:

Language	Username	Password
German	simon_de	simonde
English	simon_en	simonen
Italian	simon_it	simonit

To add new time triggered commands to the users calendar provide the following summary:

[simon-command] <plugin name>//<command name>

Abbildung 1: Triggering the breakfast reminder at 2:29 pm

Replace <plugin name> and <command name> with the corresponding entries as displayed in the command documentation. Please note that the plugin name is expected to be the translated, human readable plugin name. The command name does not contain any plugin triggers.

If multiple commands match the description, the first one (in order of the configured scenarios and plugins) will be executed. If no command matches the entry it will be silently ignored.

Woche Monat Liste < März 19 — 25 2012 >

	Mo 19. März	Di 20. März	Mi 21. März	Do 22. März	Fr 23.
Ganztags					
00:00					
01:00					
02:00					
03:00					
04:00					
05:00					
06:00					
07:00					
08:00					

Neues Ereignis

Titel: Testevent

Kategorie: Kategorie auswäh... Kalender: Default calendar

Dialog language: English Dialog: Select option (EN)

Alarm: No When:

Ganztägiges Ereignis

von: 20-03-2012 04:00

bis: 20-03-2012 04:30

Erweiterte Optionen

Bestätigen

- Select option (EN):
- Breakfast reminder
- Personal hygiene reminder
- Medication
- Stand up
- Skype
- Coffee time reminder
- Lunch reminder
- Dinner reminder
- Drinking reminder
- Personal appointment

List of available commands

Language	Plugin name	Trigger
EN	Dialog	Breakfast reminder
EN	Dialog	Personal Hygiene reminder
EN	Dialog	Medication
EN	Dialog	Stand Up
EN	Dialog	Skype
EN	Dialog	Coffee time reminder
EN	Dialog	lunch reminder
EN	Dialog	Dinner reminder
EN	Dialog	Drinking reminder
EN	Dialog	Event reminder
EN	Dialog	Personal appointment
DE	Dialog	Körperhygiene Erinnerung
DE	Dialog	Veranstaltung
DE	Dialog	Aufstehen Erinnerung
DE	Dialog	Frühstück Erinnerung
DE	Dialog	Persönliche Termine

DE	Dialog	Mittagessen Erinnerung
DE	Dialog	Skype
DE	Dialog	Trinken
DE	Dialog	Medikamente
DE	Dialog	Kaffeezeit Erinnerung
DE	Dialog	Abendessen Erinnerung
IT	Dialogo	Pausa caffè
IT	Dialogo	Promemoria die eventi
IT	Dialogo	Alzarsi-dialogo
IT	Dialogo	Igiene corporea e svestirsi la sera
IT	Dialogo	Skype
IT	Dialogo	Appuntamenti personali
IT	Dialogo	Ricordare di bere regolarmente
IT	Dialogo	Pranzo
IT	Dialogo	Medicina
IT	Dialogo	Colazione
IT	Dialogo	Cena

7. Conclusions

The last six months of the project we have to concentrate our work to the task 4

Task 4: Integration and Final Experimentation [month 9 - month 18]		
Participant	Role	Person-months
SSSA	Leader	20
SL	Partner	7
<p>Objectives:</p> <ol style="list-style-type: none"> 5) Integration and assembling of parts from the previous three tasks. 6) Revisiting of results from previous tasks, also according to milestone. 7) Development of additional functionalities. 8) Experimentation. <ul style="list-style-type: none"> • All the three part developed in the previous tasks will be integrated together on the SCITOS-G5 robotic platform. Thanks to the versatile onboard PC, installed on the SCITOS-G5, a communication interface between the robotic platform and both the Simon software and ZigBee network will be programmed. • In general results achieved in the previous tasks will be evaluated together in a whole system. If it is necessary, some improvements or changes will be performed, also considering milestone verifications. • Functionalities such as communication, reminder functions, monitoring and safety will be implemented. The core and management of those will be developed on a PC (Server ZigBee), which, by means of ZigBee network, could tell robot to go to the user and interact with him. If for exemplum it is time to switch off a device, watch program on TV, take pillows, be ready for a date, the robot goes to the user and remind him. Or if the robot understands an unsafe situation for user, then it can contact an external service for assistance by using GSM network. • Several experiments, similar to exemplum of previous point will be widely tested in the living lab of SSSA. Also a group of possible users will be invited to participate in experimentation in order to evaluate the acceptability and usability of the system. 		

To fulfill this task we installed a teststation in Austria to experiment all functionalities of the software and to prepare all tests of signal processing before integrating the software and tests on the robot and realizing the tests of signal processing in the natural environment in Pisa.

Many parts of the solution are prepared and it's necessary to integrate and test them, before realizing the practical experiments in the natural environment.

The focal point for the last six months is:

- a. Scientific tests of the different zones of communication
- b. Construction of the Italian speech model
- c. Configuration of the dialogues in German Italian and English
- d. Adaption of the framework to the defined scenarios
- e. Programming different functions like mail client aso.

- f. Establishing the combination between speech and touch commands to the actions of the robot
- g. Integration of the software to the robot
- h. Combination of the software with the path planning of the robot
- i. Realizing practical test in the natural invironment in Pisa
- j. Evaluation and dissemination

8. Attachments

8.1. SIMON Microphone preselection

Stefan Petrik, Susanne Rexeis

22.6.2010

Description

- Objectives:
 - For a given amount of microphones and a given environmental setup:
 - The microphone with the best recognition rate
 - maximize speech recognition rate for a specific microphone
 - Specifications for better/worse environmental setup
- Testing requirements:
 - Realistic Setup for request cases
 - Reproducibility of results

Recording setup

- Hardware:
 - YAMAHA play Speakers for reference image (Headset-Aufnahme)
 - Microphone
 - MIC1 = AcousticMagic VoiceTracker
 - MIC2 = t-bone 150 SC Studiomicrophon with Cardioid
 - MIC3 = Samson CM12C Hanging microphon
 - MIC4 = AKG D542 E Gooseneck-Microphon
 - MIC5 = Samson UB1 USB boundary microphone
 - Wandler: RME Fireface 800
 - Laptop with FireWire-PCMCIA card
 - Furniture: Table, chair, shelf
- Software:
 - PureData with PD-Patches playrec-array_auto.pd, get_recording_ch26.pd
 - Audacity f. Samson UB-1
- Order of events:

- recording on reference images with Headset
- Environmental construction of the scenario
- Play & record
- Miscellaneous:
 - Reinforcement/volume traded for reproducibility



Illustration 1: test structure for environmental microphone test IEEG140, Inffeldgasse 16. In the picture: RME FireFace 800 Wandler, Mikrofone MIC1-MIC5, YAMAHA Monitor speakers, laptop for recording control

Experiments

- Data (Reference recording):
 - 1 Spokesman
 - Headset-recordings (Sennheiser PC-25 USB)
- Tasks:
 - connected digits (S****)
 - commands-Simon (C****)
- Data Sets
 - Train-Set (alle S**** except each 5., C00**-C01** & C04**-C05**)
 - Dev-Set (C02**)
 - Eval-Set (each 5. S****, C03**)
- Positions of recording (Distance & angle of microphone source):
 - POS1 = 2m, 0 Grad
 - POS2 = 1m, 45 Grad
 - POS3 = 1.5m, 90 Grad

Experiment 0

ASR-Model from headset recordings tested trough headset recordings (matched training/ test condition)

NUMMIX	1	2	4	8	16
WER	91.30	92.75	92.75	91.30	88.41

Table 1: Word error rate for Experiment 0 in dependence of GMM mixtures in an acoustic model

Experiment 1

ASR-Model from headset recordings tested with recordings from different microphones (unmatched training/test condition)

	MIC1		MIC2		MIC3		MIC4		MIC5	
		adapted		adapted		adapted		adapted		adapted
POS1	50.72	89.86	72.46	94.20	69.57	91.30	66.67	94.20	60.87	89.86
POS2	55.07	84.06	78.26	95.65	76.81	92.75	84.06	95.65	69.57	91.30
POS3	49.28	86.96	63.77	89.86	79.71	94.20	65.22	92.75	71.01	92.75

Table 2: Word error rate for Experiment 1 with microphones 1-5 on position 1-3 with 2 GMM mixtures

	MIC1		MIC2		MIC3		MIC4		MIC5	
		adapted		adapted		adapted		adapted		adapted
POS1	52.17	92.75	73.91	94.20	71.01	94.20	75.36	92.75	59.42	94.20
POS2	52.17	78.26	79.71	95.65	73.91	94.20	88.41	98.55	71.01	91.30
POS3	43.48	86.96	60.87	95.65	76.81	94.20	73.91	94.20	76.81	95.65

Table 3: Word error rate for Experiment 1 with microphones 1-5 on position 1-3 with 4 GMM mixtures

Experiment 2

ASR-Model tested trough environmental recordings from environmental recordings on same position (matched training/test condition)

	MIC1		MIC2		MIC3		MIC4		MIC5	
		adapted		adapted		adapted		adapted		adapted
POS1	79.71	98.55	85.51	98.55	69.57	100.00	84.06	100.00	86.96	97.10
POS2	89.86	97.10	88.41	98.55	94.20	100.00	82.61	95.65	83.82	98.55

POS3	85.29	98.55	79.71	98.55	89.86	98.55	78.26	97.10	70.59	
------	-------	-------	-------	-------	-------	-------	-------	-------	-------	--

Table 4: Word error rate for Experiment 2 with microphones 1-5 on position 1-3 with 2 GMM mixtures

	MIC1		MIC2		MIC3		MIC4		MIC5	
		adapted		adapted		adapted		adapted		adapted
POS1										
POS2										
POS3										

Table 5: Word error rate for Experiment 2 with microphones 1-5 on position 1-3 with 4 GMM mixtures

Experiment 3

ASR-Model from environmental recordings (POS1), tested with different position in space (POS3)

	MIC1		MIC2		MIC3		MIC4		MIC5	
		adapted		adapted		adapted		adapted		adapted
POS3	75.00	92.75	85.29	97.10	69.57	100.00	75.36	100.00	77.94	97.10

Table 6: Word error rate for Experiment 3 with microphones 1-5 on position 1-3 with 2 GMM mixtures

	MIC1		MIC2		MIC3		MIC4		MIC5	
		adapted		adapted		adapted		adapted		adapted
POS3	69.12	92.75	83.82	98.55	68.12	100.00	81.16	100.00	82.35	100.00

Table 7: Word error rate for Experiment 3 with microphones 1-5 on position 3 with 4 GMM mixtures

Experiment 4

ASR-Model from environmental recordings mixed with different positions, tested with one specific position

	MIC1	MIC2	MIC3	MIC4	MIC5
POS1	66.67	76.81	79.41	68.12	82.61
POS2	63.24	67.65	82.61	78.26	76.81
POS3	76.47	76.81	88.06	82.61	73.53

Table 8: Word error rate for Experiment 4 with microphones 1-5 on position 1-3 with 2 GMM mixtures

	MIC1	MIC2	MIC3	MIC4	MIC5
POS1	66.67	76.81	76.81	72.06	76.12
POS2	63.24	75.00	77.94	78.26	77.61
POS3	73.53	79.71	80.88	85.29	76.12

Table 9: Word error rate for Experiment 4 with microphones 1-5 on position 1-3 with 4 GMM mixtures

Experiment 5

ASR-Model from environmental recordings, tested with recordings together with noises (Task: connected digits)

	MIC1	MIC2	MIC3	MIC4	MIC5
POS1	70.24	38.10	45.24	60.71	35.29

Table 10: Word error rate for Experiment 5 with microphones 1-5 on position 1 with 2 GMM mixtures

	MIC1	MIC2	MIC3	MIC4	MIC5
POS1	72.62	50.00	46.43	65.48	45.59

Table 11: Word error rate for Experiment 5 with microphones 1-5 on position 1 with 4 GMM mixtures

Conclusion

- Speech recognition underneath environmental influences is good-very good possible
- Requirements
 - recording training data under similar Conditions (matched training/test condition)
- Adaption improves the performance of recognition clearly again
- Microphone selection
 - very good and robust performance of AKG D542 E Gooseneck-Microphone, even with noises
 - similar good performance from Samson CM12C Hanging microphones, but liable up to noises
 - moderate performance of AcousticMagic VoiceTracker, slight advantages just with noise

8.2. Analysis of microphones for speech recognition from distances

Analysis of microphones for speech recognition

Microphone Distances:	Average recognition rate						
	Test 1						
	0cm	30cm	100cm	200cm	300cm	400cm	500cm
THE T.BONE TB312S gooseneck microphone 0°		99,78%	92,43%		72,43%		
THE T.BONE TB312S gooseneck microphone 45°					90,91%	84,74%	84,17%
THE T.BONE TB312S gooseneck microphone 90°					87,00%	81,78%	87,87%
Sony ECM-MS907							
Sony ECM-CZ10	94,35%	87,00%	84,61%				
SAMSON CM12C hanging microphone		100,00%	100,00%				
Sennheiser PC 36 USB Headset	100,00%						
Samson UB1		88,83%	86,52%				
Acoustic Magic							
Samson Q1U 0°		99,30%	86,83%				
Samson Q1U 45°		98,30%	88,35%				
Samson Q1U 90°		97,22%	86,52%				
THE T.BONE wireless microphone system							

Microphone Distances:	Average recognition rate						
	Test 2						
	0cm	30cm	100cm	200cm	300cm	400cm	500cm
THE T.BONE TB312S gooseneck microphone 0°		9,87%	89,96%		64,87%		
THE T.BONE TB312S gooseneck microphone 45°					82,83%	90,74%	78,83%
THE T.BONE TB312S gooseneck microphone 90°					93,96%	83,57%	83,70%
Sony ECM-MS907							

Sony ECM-CZ10	94,96%	90,35%	90,13%				
SAMSON CM12C hanging microphone		100,00%	100,00%				
Sennheiser PC 36 USB Headset	100,00%						
Samson UB1		95,70%	82,70%				
Acoustic Magic							
Samson Q1U 0°		99,91%	93,43%				
Samson Q1U 45°		93,65%	91,26%				
Samson Q1U 90°		97,57%	85,30%				
THE T.BONE wireless microphone system							

Microphone	Average recognition rate						
	Distances:	Test 3					
		0cm	30cm	100cm	200cm	300cm	400cm
THE T.BONE TB312S gooseneck microphone 0°		98,43%	87,04%		71,04%		
THE T.BONE TB312S gooseneck microphone 45°					89,70%	91,04%	87,91%
THE T.BONE TB312S gooseneck microphone 90°					95,09%	87,83%	90,00%
Sony ECM-MS907							
Sony ECM-CZ10	93,87%	92,96%	85,74%				
SAMSON CM12C hanging microphone		100,00%	100,00%				
Sennheiser PC 36 USB Headset	100,00%						
Samson UB1		96,61%	90,83%				
Acoustic Magic							
Samson Q1U 0°		99,91%	98,00%				
Samson Q1U 45°		98,61%	86,61%				
Samson Q1U 90°		99,74%	79,78%				
THE T.BONE wireless microphone system							

Microphone	Average recognition rate						
	Distances:	Test 4					
		0cm	30cm	100cm	200cm	300cm	400cm

THE T.BONE TB312S gooseneck microphone 0°		99,83%	90,35%		81,17%		
THE T.BONE TB312S gooseneck microphone 45°					86,22%	88,09%	89,26%
THE T.BONE TB312S gooseneck microphone 90°					89,74%	89,52%	83,17%
Sony ECM-MS907							
Sony ECM-CZ10	95,00%	93,22%	78,00%				
SAMSON CM12C hanging microphone		100,00%	98,00%				
Sennheiser PC 36 USB Headset	100,00%						
Samson UB1		95,57%	87,09%				
Acoustic Magic							
Samson Q1U 0°		99,96%	95,30%				
Samson Q1U 45°		95,13%	88,87%				
Samson Q1U 90°		98,96%	83,61%				
THE T.BONE wireless microphone system							

Microphone	Average recognition rate						
	Distances:	Test 5					
		0cm	30cm	100cm	200cm	300cm	400cm
THE T.BONE TB312S gooseneck microphone 0°		99,74%	83,35%		88,17%		
THE T.BONE TB312S gooseneck microphone 45°					93,00%	83,87%	86,09%
THE T.BONE TB312S gooseneck microphone 90°					92,26%	90,22%	82,83%
Sony ECM-MS907							
Sony ECM-CZ10	98,83%	90,22%	93,96%				
SAMSON CM12C hanging microphone							
Sennheiser PC 36 USB Headset	100,00%						
Samson UB1		92,04%	92,09%				
Acoustic Magic							
Samson Q1U 0°		99,65%	92,13%				
Samson Q1U 45°		99,83%	90,17%				

Samson Q1U 90°		99,61%	80,65%				
THE T.BONE wireless microphone system							

8.3. Recorded Italian wordlist

1	zero
2	uno
3	due
4	tre
5	quattro
6	cinque
7	sei
8	sette
9	otto
10	nove
11	numero
12	si
13	no
14	ripetere
15	ripeti
16	grazie
17	per favore
18	prego
19	cancellare
20	va bene
21	ok
22	indietro

23	interrompere
24	interrompi
25	smetti
26	piú in su
27	piú in giú
28	su
29	giu
30	pagina
31	davanti
32	avanti
33	a sinistra
34	a destra
35	piu forte
36	alza
37	piu piano
38	abbassa
39	stop
40	pausa
41	registrare
42	registra
43	simon
44	finito
45	basta
46	cominciare
47	comincia
48	lista

49	chiudere
50	chiudi
51	aprire
52	apri
53	spegnere
54	spegni
55	accendere
56	accendi
57	dormire
58	dormi
59	svegliarsi
60	svegliati
61	aiuto
62	infermiera
63	cercare
64	cerca
65	entrare
66	entra
67	colore
68	rosso
69	verde
70	blu
71	giallo
72	destinatario
73	allenamento
74	piano

75	veloce
76	computer
77	inglese
78	tedesco
79	italiano
80	allargare
81	allarga
82	stringere
83	stringi
84	testi
85	mandare
86	manda
87	contatti
88	virgola
89	calcolatrice
90	per
91	piu
92	meno
93	diviso
94	per cento
95	sala
96	soggiorno
97	camera da letto
98	cucina
99	anticamera
100	balcone

101	porta
102	finestra
103	serranda
104	tapparella
105	tenda
106	luce
107	parte della testa
108	parte del piede
109	temperatura
110	aria condizionata
111	riscaldamento
112	piu caldo
113	piu freddo
114	la porta di casa
115	ingresso
116	tastiera
117	mouse
118	recinto
119	telefono
120	rispondere
121	rispondi
122	chiudere
123	chiudi
124	telefonare
125	telefona
126	per

127	premere
128	premi
129	astro
130	controlla
131	vieni qui
132	vai
133	il
134	la
135	da
136	in
137	fotografie
138	calendario
139	video
140	filmati
141	televisione
142	bagno
143	girare
144	girati
145	vai via

8.4. Simontouch Voice Commands

Action	Command EN	Command DE	Command IT
General			
Goes back	Back	Zurück	Indietro
Mainscreen			
Opens Information	One	Eins	Uno
Opens Communication	Two	Zwei	Due
Opens Check	Three	Drei	Tre
Opens Requests	Four	Vier	Quattro
Information			
Opens Images	One	Eins	Uno
Opens Music	Two	Zwei	Due
Opens Videos	Three	Drei	Tre
Opens News	Four	Vier	Quattro
Images			
Scrolls up	Up	A su	Rauf
Scrolls down	Down	A giù	Runter
Start Slideshow	Ok	Ok	Ok
Stop slideshow	Stop	Stop	Stop
Music			
Scrolls up	Up	A su	Rauf
Scrolls down	Down	A giù	Runter
Play selected item	Ok	Ok	Ok
Stop playing item	Stop	Stop	Stop
Videos			
Scrolls up	Up	A su	Rauf
Scrolls down	Down	A giù	Runter
Play selected item	Ok	Ok	Ok
Stop playing item	Stop	Stop	Stop
Fullscreen	Full-screen	Finestra	Voll-bild
News			
Select first feed	One	Eins	Uno
Select second feed	Two	Zwei	Due
Select third feed	Three	Drei	Tre
Select fourth feed	Four	Vier	Quattro

Newsfeed			
Next Headline	Right	A destra	Rechts
Previous Headline	Left	A sinistra	Links

Communication			
Scroll up	Up	A su	Rauf
Scroll down	Down	A giù	Runter
Call on computer	One	Eins	Uno
Call on phone	Two	Zwei	Due
Send message	Three	Drei	Tre
Read messages	Four	Vier	Quattro

Read messages			
Scroll up	Up	A su	Rauf
Scroll down	Down	A giù	Runter

Active call			
Accept call	Accept	Ok	Ok
Hang up	Hang up	Stop	Stop

Check			
Activate water control	One	Eins	Uno
Activate door control	Two	Zwei	Due
Activate cooker control	Three	Drei	Tre
Activate gas control	Four	Vier	Quattro

Requests			
Opens Shopping	One	Eins	Uno
Opens transport	Two	Zwei	Due
Opens support	Three	Drei	Tre

Shopping			
Opens household	One	Eins	Uno
Opens medicine	Two	Zwei	Due

Household			
Scroll up	Up	A su	Rauf
Scroll down	Down	A giù	Runter
Select left	Left	A sinistra	Links
Select right	Right	A destra	Rechts
Add amount	Plus	Piu	Plus
Decrease amount	Minus	Meno	Minus
Place order	Ok	Ok	Ok

Medicine			
Scroll up	Up	A su	Rauf
Scroll down	Down	A giù	Runter
Select left	Left	A sinistra	Links
Select right	Right	A destra	Rechts
Add amount	Plus	Piu	Plus
Decrease amount	Minus	Meno	Minus
Place order	Ok	Ok	Ok

Transport			
Calls a taxi	One	Eins	Uno
Calls the ambulance	Two	Zwei	Due
Calls a private transport	Three	Drei	Tre

Support			
Calls a doctor	One	Eins	Uno
Calls the ambulance	Two	Zwei	Due
Calls a carer	Three	Drei	Tre
Calls a known person	Four	Vier	Quattro

8.5. Protocol Work Session

Pisa reporting work session 18.04.2011 – 21.04.2011

Participants:

Filippo Cavallo, Manuele Bonaccorsi

Michela Aquilano, Raffaele Limosani

Stieger Franz, Stieger Mathias, Grasch Peter, Stieger Michael

1.) Interchange of actual results and reviewing the first period

2.) Szenario development:

User - Robot:

From the proposed scenarios from the XBMC platform we can use in the ASTROMOBILE project the following scenarios and offers for the user, when the robot stays in front of the User after calling him:

- weather
- news based on RSS feeds maybe with speech synthesis to read the news
- **Multimedia** offers like:
 - Photos
 - Music
 - Videos – maybe television
- **Communication** offers like Skype calls
- **Organization** offers: scheduler

To complement the actually existing offers and services it's necessary to think about the following services

- **Control functions** in the natural environment ordered by the user and configured feedback by the robot using the recording of a 10 second video and presenting it to the user, when the robot comes back like
 - Control of the water in the bathroom
 - Control of the doors in the environment
 - Control of the cooker
 - Control of the gas and other critical functions
 - aso

- **Request functions:** With the help of the XBMC platform the user should be able to initiate some requests like
 - **Request of new medicine**
 - **Request of food**
 - **Request of acute help**
 - **Request of general help by the caregiver**
 - **Request of caregiver transport to the doctor or other events**
 - **Pre-established SMS-Service with the list PlugIn**
 - **aso.**

Robot - User:

- **Reminder functions with request of help** are prepared for the following situations like
 - Alarm in the morning
 - Reminding of the hygiene and dressing in the morning
 - Reminding of the hygiene and facing in the evening
 - Reminding of taking the ordered drugs
 - Reminding of periodic drinking
 - Reminding of eating in the morning
 - Reminding of eating in the noontime
 - Reminding of eating in the evening
 - Reminding of coffee time
 - Reminding of periodic Skype calls

 - **Simple reminder functions** without request of help are prepared for the following situations like:
-

- Reminding of events (Based on calendar)
- Reminding of birthdays
- Reminding of appointments like
 - Meeting with friends
 - Consultation with doctors
 - Visit of events
 - Personal appointments in the calendar
- Dialogue-actions: (skype and mailing) (simple reaccion yes or no!)
 - Incoming Skype calls with the possibility to accept or refuse the call
 - Incoming mails with the possibility to allow or refuse that the robot reads the message
 - Incoming appointment requests with the possibility to allow or refuse the appointment

Caregiver – robot - user

- Control functions:
 - Caregiver have access to the information of the sensors in the environment
 - Caregiver can administrate the dialogues, appointments and reminder functions for the user on the calender
 - Caregiver can activate the robot to transmit a visual impression of the user in case of emergency
- Communication functions
 - Caregiver can call the user using the Skype dialogue

- Caregiver can sent an appointment to convene with the user using the robot and the calendar
- Caregiver can sent an information with E-Mail using the mail reading dialogue

Function requirements

Access to a keyboard – simon keyboard or dasher scenario

8.5.1.1. Speech recording

Work process with partners to adapt the wordlist to the requirements of Astromobile and the cultural area of Pisa!

From 111 words to 145 words

Checking the XBMC wordlist to the requirements of Astromobile and the cultural area of Pisa

Recordings first day: 9 persons – in half an hour it was only possible to record the 145 words

Problems with the recording software ???

Second day: 6 elder persons and 17 members of the Escuela St. Ana

Third day:

Total: 47 recordings

8.5.1.2. Interface development

Scientific discussion about the first solution!

D-Bus was decided by Peter!!!

Web based solutions??? One Option for the future!!

Installation of Ubuntu 10 was necessary to follow the steps of installation

Problems with the license of Metralabs installing Ubuntu

Changing the button television with the photo of astro with a submenu to control the robot to make some movement to control that the communication between simon, the touchscreen and the navigation of the robot is running and to control too that the speech synthesis is running

Training process in the management of the D-Bus interface between Peter and Filippo

8.5.1.3. Installation of the graphical and touchscreen interface

Download XBMC

Copies of software, digital wordlists, German and English speech models, skins, lexica, Italian wordlists, Italian and German dialogues

Installation and adaption of the graphical interface and installation of the touchscreen function.

Some problems with the touchscreen because the original driver was not running – only the open source driver. The implementation in XBMC is done.

Change the button television with the photo of astro and define a submenu to control the robot. It was made only a short demo to demonstrate that the D-Bus interface is running and the functions of speech and touchscreen control of the robot is possible and prepared to develop the different scenarios en the details.

8.5.1.4. Signal processing

Members of the Escuela St. Ana made an adaption of the electrical access of the wireless receiver to the battery of the robot.

It's necessary to test this solution al final of this working session.

Note: Sound of sonar disturbs the speech recognition

8.5.1.5. Future ideas

Face detection of the robot once changed the camera upon the flat screen

8.5.1.6. Evaluation of the working process with our team

8.5.1.7. Tasks for the next six months simon listens

- a. Working on the Italian speech model (Generalized)
- b. Working on the German speech model and adapt it to the specific Astromobile needs (Generalized)
- c. Working on the English speech model and adapt it to the specific Astromobile needs (Generalized)
- d. Planning and preparing the tests of speech recognition from distances in the Living Lab in September 2011. Making preliminary tests in Austria with different microphone systems
- e. Working on short speech models in Italian, German and English for the calling zone for testing them in the living lab
- f. Finalization of the scenario definition and scenario development
- g. Programming: Management of simon of the Input from different microphones and management of different speech models for different communication zones
- h. Different skins for the Touchscreen based on testing user interface
- i. Describe the D-Bus/Peter / scientific paper
- j. Other paper proposals
- k.

8.6. Protocol End-User Tests

Design, development and experimentation of ASTRO Robot Companion for ageing well and Ambient Assisted Living applications

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The objective of this paper is to demonstrate the general feasibility, S/T effectiveness and acceptability by end-users of the advanced robot companion ASTRO, integrated in intelligent environments, which is able to actively work in real conditions and cooperate with elderly to provide favorable independent living, improving quality of life and efficiency of care. The robot ASTRO was built in three phases by an (inter/multi)disciplinary team, based on technology developers, elderly care organizations and designers.

During the design phase, 11 elderly people 65+ were involved to identify the functionalities of ASTRO to satisfy their needs (usefulness) and the acceptability criteria to achieve a familiar and emotionally accepted robot (affordance, friendliness) with appropriate shape, colors and materials (aesthetics) and safe perception (safety).

The development of ASTRO was conceived to be integrated in an Ambient Intelligent infrastructure based on a wireless sensor network, able to monitor and localize the end-user, the robot and objects. ASTRO was equipped with multimodal interfaces, (speech recognition, vocal synthesis, touch screen with simplified graphical interface, colored LEDs and smart phone) developed to simplify and make natural and intuitive the interaction with end-users.

The entire system was implemented to provide services in three modalities:

1. the user calls ASTRO because he/she needs:
 - a physical help to stand up from the sofa or the bed,

- an object on the ASTRO's pocket (glass, TV controller, ...),
 - video calls or information,
 - entertainment applications;
2. ASTRO autonomously moves to the user for:
 - reminding to take drugs or appointments,
 - alerting for critical situation in the house;
 3. the caregiver contacts remotely ASTRO asking it to move to the user and activate the webcam to support him/her.

During the evaluation phase, 16 elderly people 65+ (including the 11 elderly of the design phase) were involved to use ASTRO in the previous described scenario, realistically arranged in the Peccioli living lab (Figure 1), and were asked to complete a questionnaire with multiple-choice and open questions. Results of this investigation highlighted that:

- elderly had a positive view about all the functions in terms of usability;
- elderly felt the robot easy to use and were satisfied about how the tasks were performed;
- most of seniors considered ASTRO aesthetically cute, friendly and safe;
- 75% of them thought that this kind of assistance could be integrated into their lifestyle and, at the questions “Would you like to buy this robot for assistance?”, only two persons excluded this possibility.

In conclusion this work demonstrated that robotic technology for AAL applications is nowadays promising and feasible. The real and concrete involvement of elderly with a user-centred design approach allowed facing developmental aspects that made ASTRO very near to a pre-market solution. Elderly were trained to use ASTRO and this gave the possibility to better understand how to implement facilitated interfaces and to spread the culture of considering the companion robot similar to a household appliance. ASTRO was developed with an interoperable integration of mature technological and standardized solutions already available on the market, such as the mobile robotic platform (Metralabs, Germany), Wireless Sensor Network (ST Microelettronics, Italy), Software Interface (Simon Listens, Austria), robot and environment OS (Win7 and Ubuntu) and other minor components.



Figure 1 – Experimental sessions in the Peccioli Living Lab with elderly.