

Stefan P. Carmien

Design and Technical
Portfolio
2019

MAPS

Task Support system

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Dissertation Research
University of Colorado, Boulder
2001-2006

Caregivers Task prompter editor

MAPS Script Creator for

File Edit View Client Options Prompter Utilities Help

Picture Select

- better aisle 4.bmp
- debit card.bmp
- get a bag of ceasar salad.bmp
- get a box of tissues.bmp
- get a bunch of brocilli.bmp
- get a gallon of milk with a yel

Browse... Add Picture

Sound Select

- close the door.wav
- do this until all the cookie mi
- fill the cup with peanuts.wav
- fill the cup with nodles again.
- fill the cup with nodles.wav
- fill the spoon with the cookie
- get a big bowl.wav

Browse... Add Sound

Preview Sound 

Picture Select Display

Double click a picture to add it to the end of the script

Prompt Options

Apply to selected prompt:   

Partial Script View — Full Sound Name: Go to isle six .wav

- 
Go to isle 15 please
- 
put a jar off passta sauce in
- 
go to isle 12
- 
Pick out a bottle of light syrup
- 
Go to isle six



Picture Select

- better aisle 4.bmp
- debit card.bmp
- get a bag of ceasar salad.bmr
- get a box of tissues.bmp
- get a bunch of broccoli.bmp
- get a gallon of milk with a yel

Browse...

Add Picture

Sound Select

- close the door.wav
- do this until all the cookie mi
- fil the cup with peanuts.wav
- fill the cup with nodles again.
- fill the cup with nodles.wav
- fill the spoon with the cookie
- get a big bowl.wav

Browse...

Add Sound

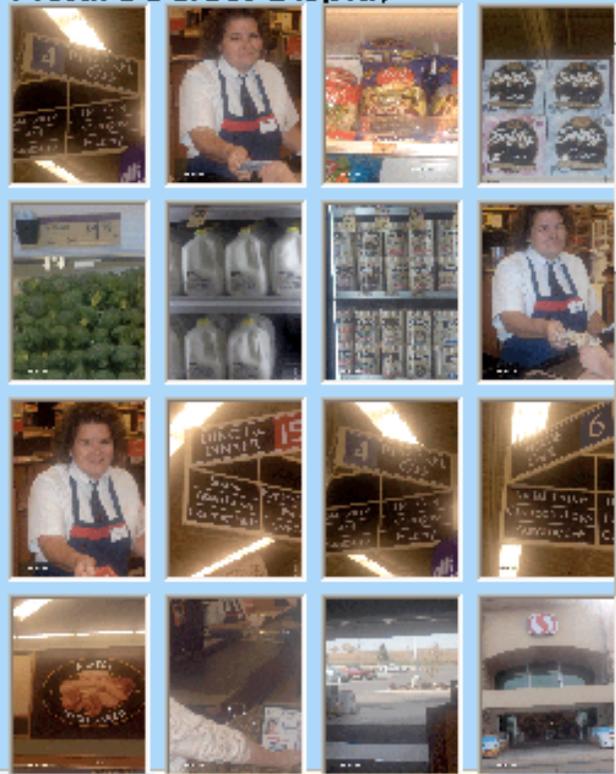
Preview Sound 

Prompt Options

Apply to selected prompt:



Picture Select Display



Run/Save Script

Whole Script View (3/row)



Partial Script View

Full Sound Name: Go to isle six .wav



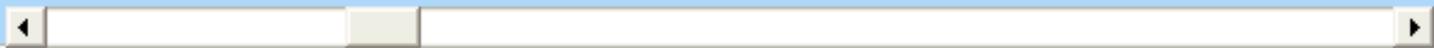
5 Go to isle 15 please

6 put a jar off passta sauce in

7 go to isle 12

8 Pick out a bottle of light syrup

9 Go to isle six



Picture Select

better aisle 4.bmp
debit card.bmp
get a bag of ceasar salad.brr
get a box of tissues.bmp
get a bunch of broccoli.bmp
get a gallon of milk with a yel

Browse...

Add Picture

Sound Select

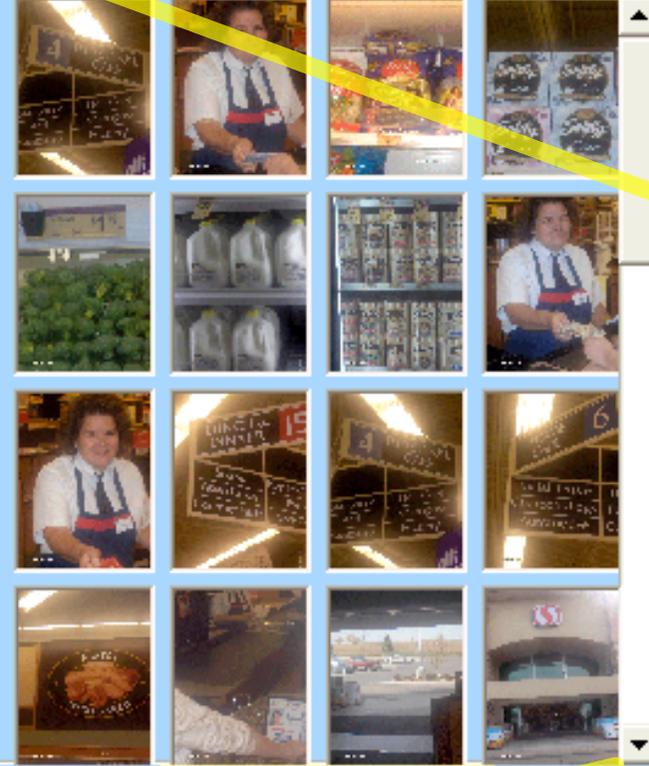
close the door.wav
do this until all the cookie mi:
fill the cup with peanuts.wav
fill the cup with nodles again.
fill the cup with nodles.wav
fill the spoon with the cookie
get a big bowl.wav

Browse...

Add Sound

Preview Sound

Picture Select Display



Run/Save Script

Prompt Options

Apply to selected prompt:



Partial Script View

Full Sound Name: fill the spoon with the cookie mixture.wav

18		19		20		21		22	
	Go to the check out lane		Give the checker the money		Give the checker the money		fill the spoon with the cookie		Sound Name

Directory selection

Play Selected Sound

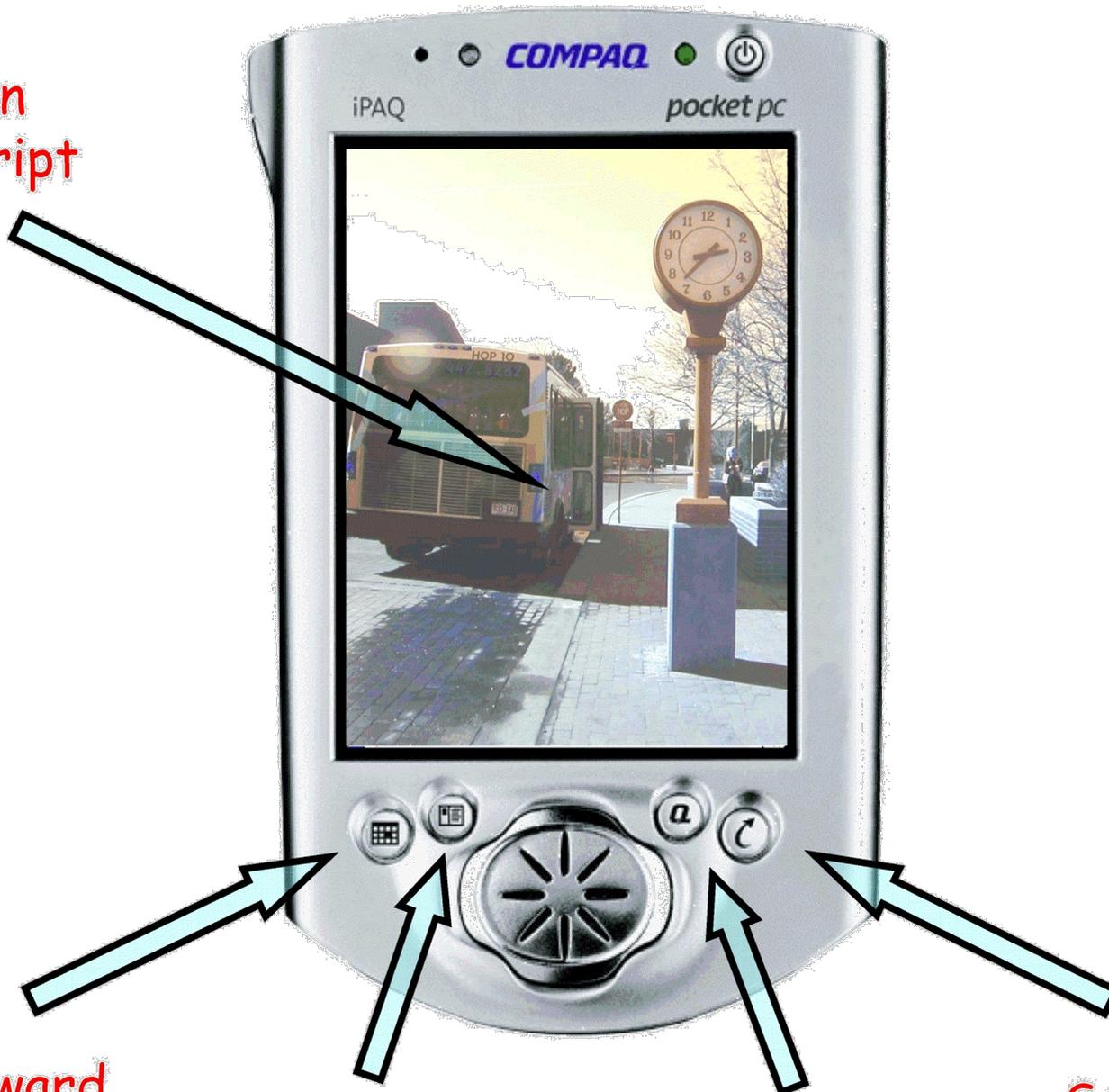
Prompt Scroll Bar

Video Help

Script Preview

End-user PDA based prompter

Touch screen
advances script



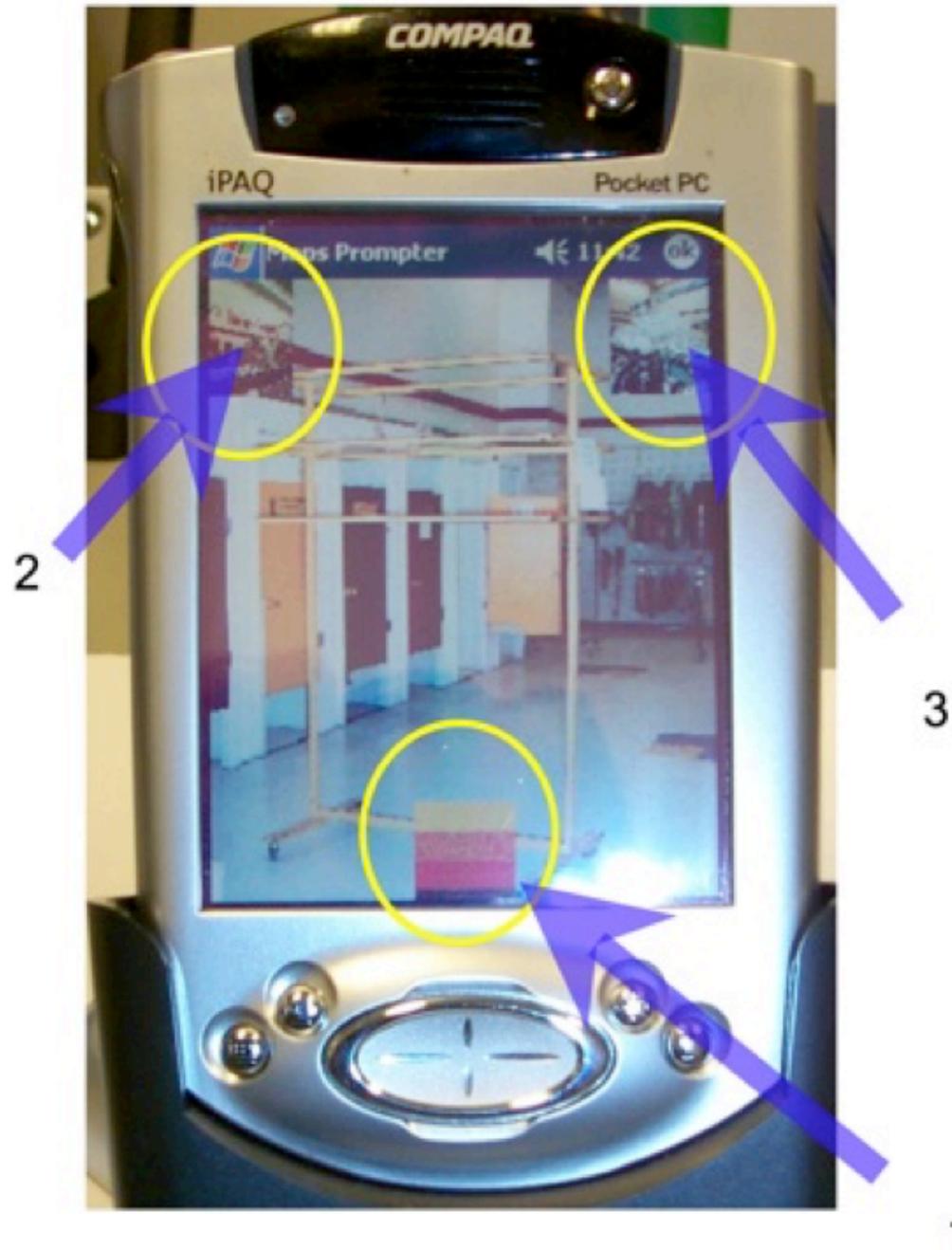
Script backward

Panic/Help button

Re-play prompt

Script forward

PDA guide – forking tasks option



MAPS early prototype error trapping and mitigation interface

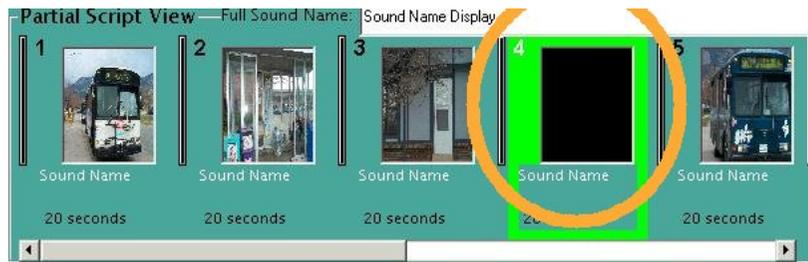
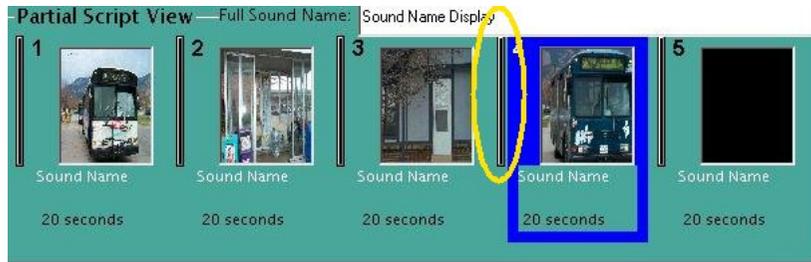
The image displays five sequential screenshots of the MAPS Script Creator interface, illustrating the error trapping and mitigation process:

- 1**: The main interface shows the 'Partial Script View' with a yellow circle highlighting step 6 and a blue arrow pointing to it.
- 2**: A 'No Error' dialog box is displayed, asking if the user wants to add error tests to the selected prompt. The options are: 'Leave it as is', 'Copy all the tests from the previous step', 'Copy all the tests from the next step', 'Add error test(s)', and 'Add conditional script element(s)'. The 'Do Selection' button is at the bottom.
- 3**: The 'Error Text and Correction Editor' dialog box is open, showing a list of error types: Distance, Duration, Getting Closer/Farther, Speed, State, Switch, Temperature, Time, and Time Till.
- 4**: The 'Error Text and Correction Editor' dialog box is shown with the 'If this happens' field populated with the text: 'If the Getting Closer/Farther between/ The Bus You Are On and Your Bus Stop at Bus - City is'. The 'First Event' is 'The Bus You Are On' and the 'Second Event' is 'Your Bus Stop'. The 'Speed' is 'Biking'. The 'Comparison If' is 'Stops Always Getting Closer To' and 'Stops Always Getting Farther From'. The 'Check' options are 'Check Once', 'Check every 5 seconds', and 'Check [] times'. The 'Next' button is visible.
- 5**: The 'Error Text and Correction Editor' dialog box is shown with the 'If this happens' field populated with the text: 'If the Getting Closer/Farther between/ The Bus You Are On and Your Bus Stop at Bus - City is Stops Always Getting Closer To and do this every 5 Seconds - till next prompt'. The 'If this happens' field is also populated with the text: 'and if that happens do this: Connect to caregiver and if THAT fails do this: Call 911'. The 'First Event' is 'The Bus You Are On' and the 'Second Event' is 'Your Bus Stop'. The 'Speed' is 'Biking'. The 'Comparison If' is 'Stops Always Getting Closer To' and 'Stops Always Getting Farther From'. The 'Check' options are 'Check Once', 'Check every 5 seconds', and 'Check [] times'. The 'Next' button is visible. The 'Primary Consequence' is 'Call 911' and 'Connect to caregiver'. The 'Secondary Consequence' is 'Call 911' and 'Connect to caregiver'. The 'Do' button is visible.

MAPS Caregiver Design Rationale

Pushing Modality

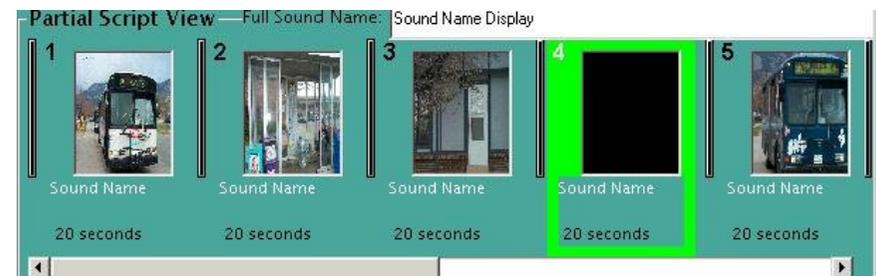
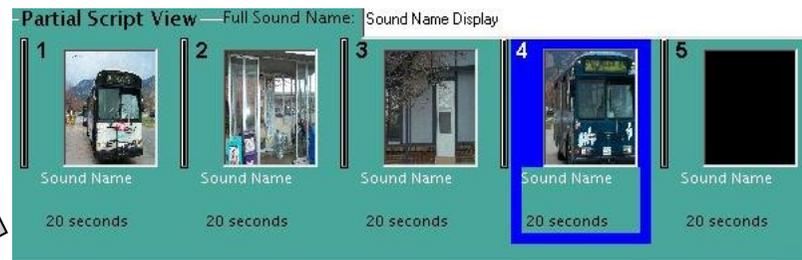
Before: In the earliest versions of the caregiver, the user could choose a menu item which would then open a form that would then allow them to insert prompts between existing prompts, or replace the pictures and sounds in prompts. These insert/replace forms forced the user to deal with inserting and replacing prompts in a most inconvenient manner. The user was also forced to be aware of what mode they were in by checking a checkbox when they wanted to insert or replace prompts.



After: One of the biggest breakthroughs for the caregiver application was to hide this modality from the user, and to make operations such as inserting and replacing more intuitive. This was accomplished by first getting rid of the forms and checkbox. Then, to allow the user to insert prompts between existing prompts, insert bars were added between the prompt boxes so that when a user clicked on the bar, a blank prompt would be inserted there.

The edit vs. append mode issue was hidden from the user by determining in what cases the user would be in append mode vs. what cases the user would be in edit mode.

It was decided that the user was only in append mode when they were adding prompts to the end of the script. Otherwise, if they clicked on an insert bar, or a prompt in the middle of the script, then they would be in edit mode, and could then replace or insert prompts. The only way that the modes are still made visible to the user, is through the color of the highlighting box surrounding the selected prompt. If the user is in append mode, the box will be blue, if they are in edit mode, the box is green.



Caregiver GUI Design Progression



- Version 1.1 August 2001**
- First version of Caregiver had slideshow style display on bottom, directory boxes, and script previewer
 - Lacked good layout and color scheme, appeared blocky and square

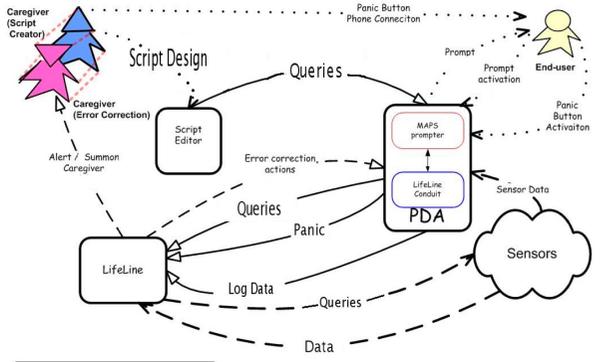
- Second version rearranged layout for more intuitive design → increased visibility to the user
- Added preview sound, play prompt and delete prompt buttons
- Less blocky design; added rounded buttons
- Updated color scheme for readability
- Added more menus to access more functionality



Version 2.1 January 2002

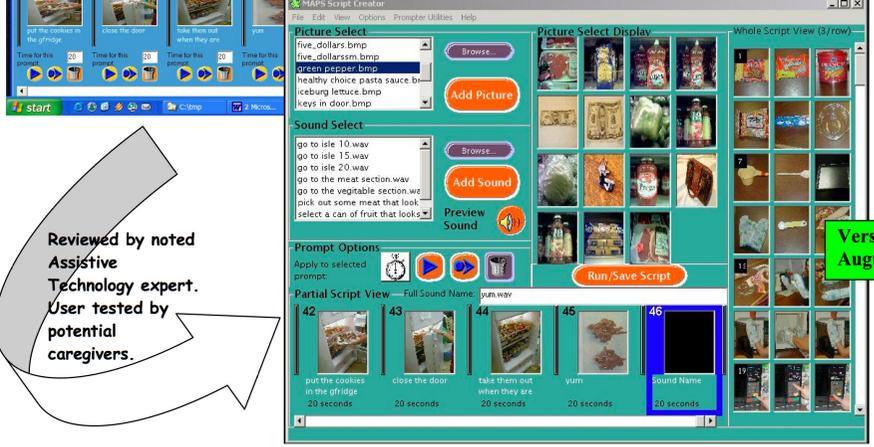
Tested and reviewed by caregivers and peers

Had peers review layout. Reorganized layout so it was more intuitive and sensible to the user.



MAPS/Lifeline Information Flow Diagram - How the MAPS Script Creator fits into the larger picture

- Version 2.2 June 2002**
- Added more functionality:
 - Picture Select Display
 - Whole Script View - modeled after power point
 - More play prompt/script buttons/options
 - Insert between prompt bars (see next page→)
 - Improved layout use:
 - Overlapping script preview with picture select display



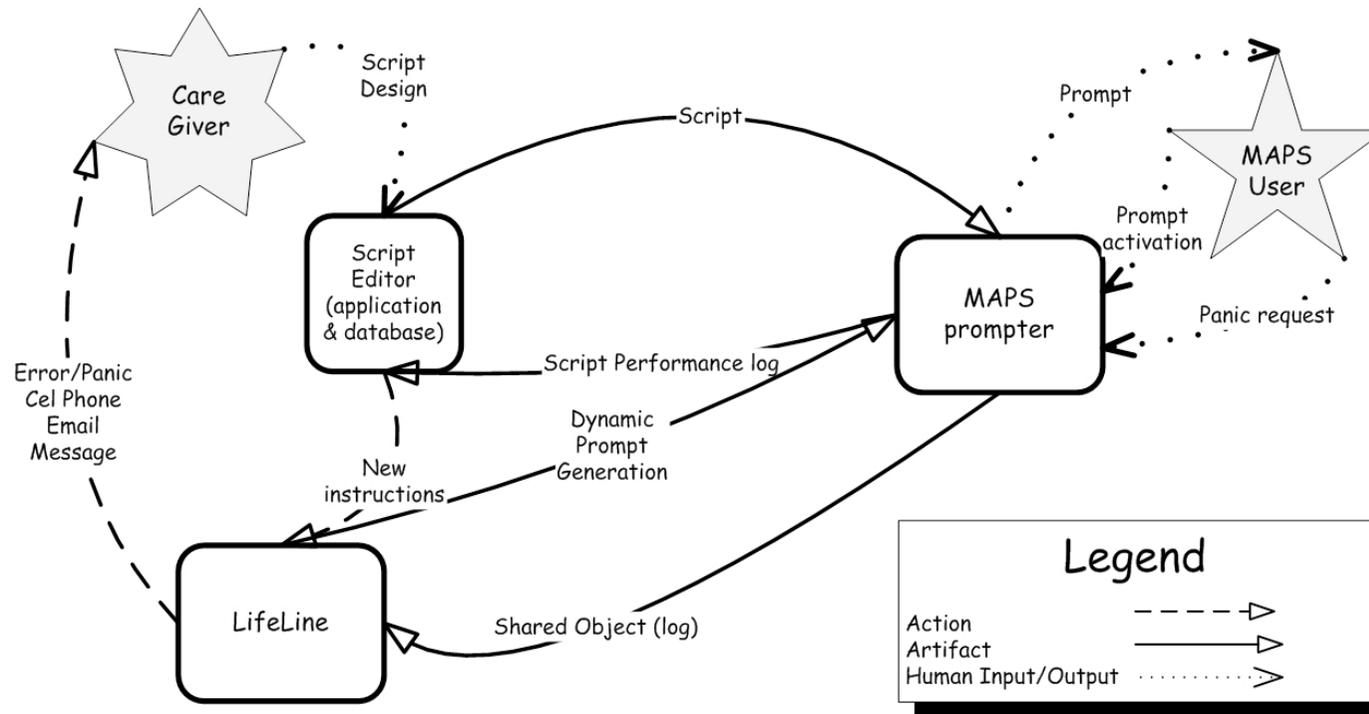
Version 3.3 August 2004

Reviewed by noted Assistive Technology expert. User tested by potential caregivers.

- Added more functionality:
 - Undo/Redo Capability
 - Right-click Large Picture Preview
- Added User Preferences
- Added Video/text MAPS Help
- Added error correction customization
- Improved layout use:
 - Added buttons for browsing directories to conserve screen real estate
 - Collapsed functionality for simpler design:
 - Reduced play, play from here and delete buttons to one set that refers to the selected prompt

MAPS/ LifeLine Conceptual Architecture

Overview: MAPS provides the user with cognitive disabilities a reliable, effective, prompting system to assist the user in accomplishing what she could not do alone. The MAPS script editor aids the caregiver in creating, storing and sharing scripts of tasks. The goal of the Lifeline project is to give caregivers the ability to monitor and provide personalized assistance to people with disabilities who are using wireless personal task prompting systems. Below is a diagram showing the dynamic interactions of the parts of the combined system.



- MAPS-Lifeline is like an ecosystem than a system that only supports the creation of an artifact by a group or team. The eco-system must support people, their environment, and changes in both, rather than just supporting an artifact.
- This is accomplished using *symmetry of ignorance*: learning from each other complimenting knowledge that allows them to accomplish together what neither could do separately.
 - The user with a cognitive disability needs scripts of the day to day life tasks that she cannot accomplish without support. The caregivers can supply these using the MAPS script editor.
 - The caregivers, in turn, need to be informed of the user's progress when using the scripts. To ensure successful script accomplishment, the caregivers need to know where and how the user has diverted from the script path, and how to help get them back on track. The Lifeline application provides this capability using data from the user's MAPS prompter and external sensors attached to the device.
- Prompting and error notification is provided thru a 'learn on demand' type pushed communication

EU4ALL

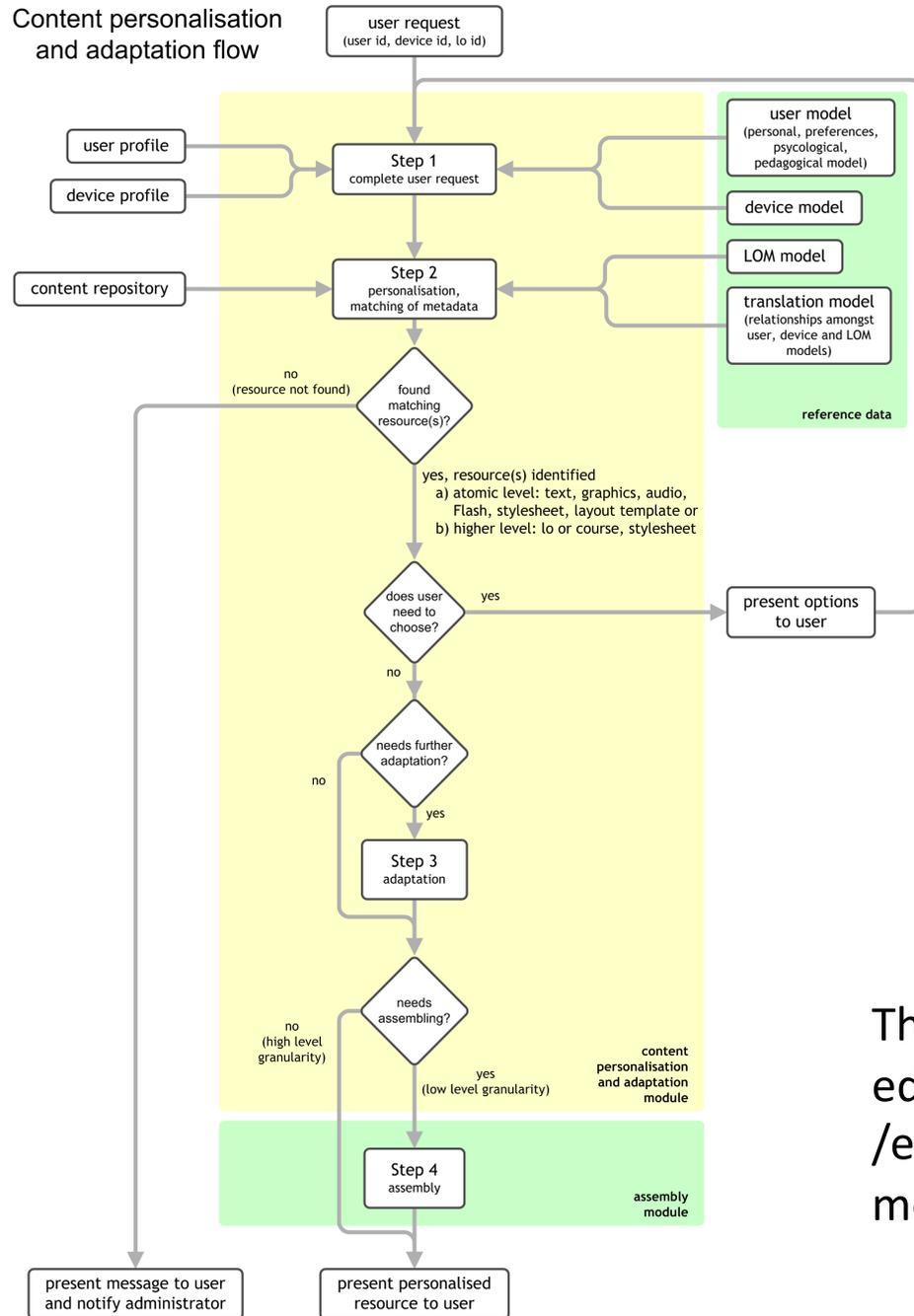
Dynamic adapted pedagogical material
delivery

Fraunhofer Institute, FIT ,
Sankt Augustin, Germany

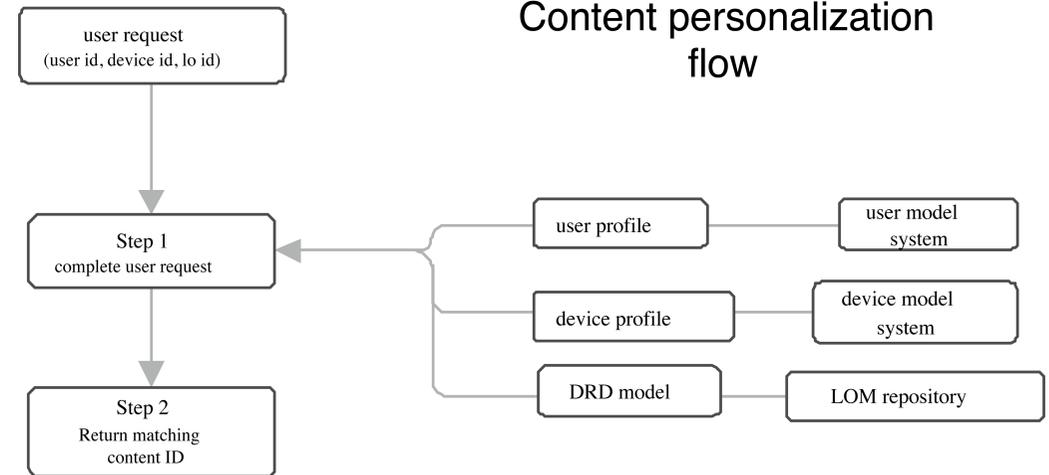
EU4ALL – EC project

2006-2008

Content personalisation and adaptation flow



Content personalization flow



This is the workflow for selecting/generating digital educational media, given a user model, a device /environment model, and a set of digital content models

Fidemaid

Financial guidance tool for Elders

Tecnalia, Neuroengineering Dept.

Internal development project

2009

Decision Wizard

Price Checker

Finance Top View

Setup

initial input



amount

in euros

vacations

how will you get funds

Bank Loan

OK

Decision Wizard

Price Checker

Finance Top View

Setup

Bank loan

You are eligible for a loan but in order to pay it off you may have to change the way you enjoy yourself - look below

before loan



While you are paying it back



It will take you 7 months to pay the loan off

OK

Shopping
Basket

Individual
Item
Comparison

market basket

Week of 24.1.09 city of Donostia

Choose one:

- Total Alimentation
- Alimentation Envasada (pan, lacteos, aceite, bebidas..)
- Frutas y Hortalizas
- Carnes
- Pescados
- Drougueria

	ALIMENTACIÓN ENVASADA (CESTA ECONÓMICA)	 EROSKI CENTER - pza. irun, s/n
		 ALCAMPO - zona araso - barrio de ventas

-  Establecimiento con el indice de precios más alto.
-  Establecimiento con el indice de precios más bajo.



Setup screen for caregiver intervention – for elder use

Intervention Triggers

when this happens

notify

suspend

missed payment of bills

multiple bill payment

lost checks

Excessive discretionary spending

numerous transfers from savings

ASSISTANT

Public transportation tool for Elders

Tecnalia, Assistant Technology Dept.

P.I.

2.7 M € 9 Partner EC / AAL project

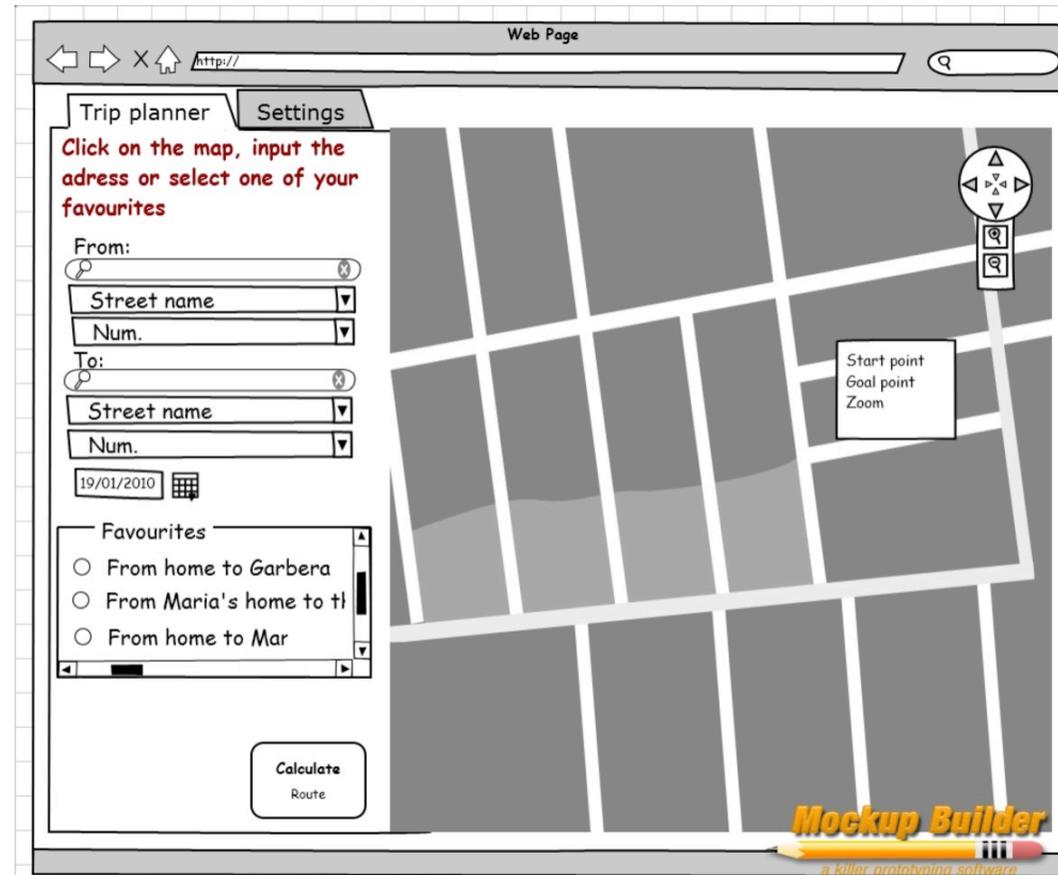
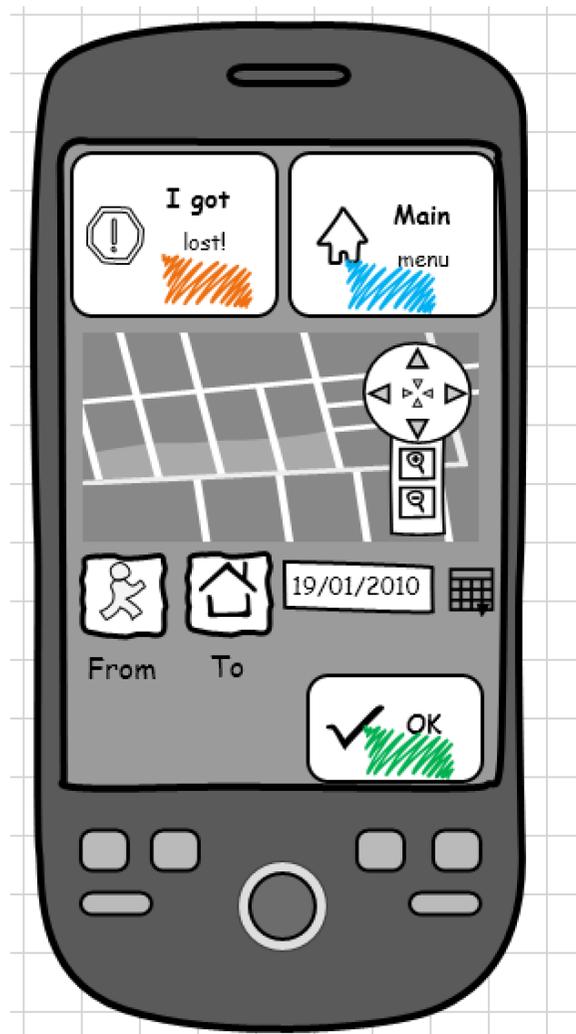
2012 - 2015

Early design variations: These 3 were presented to an elder focus group and provided support to final design



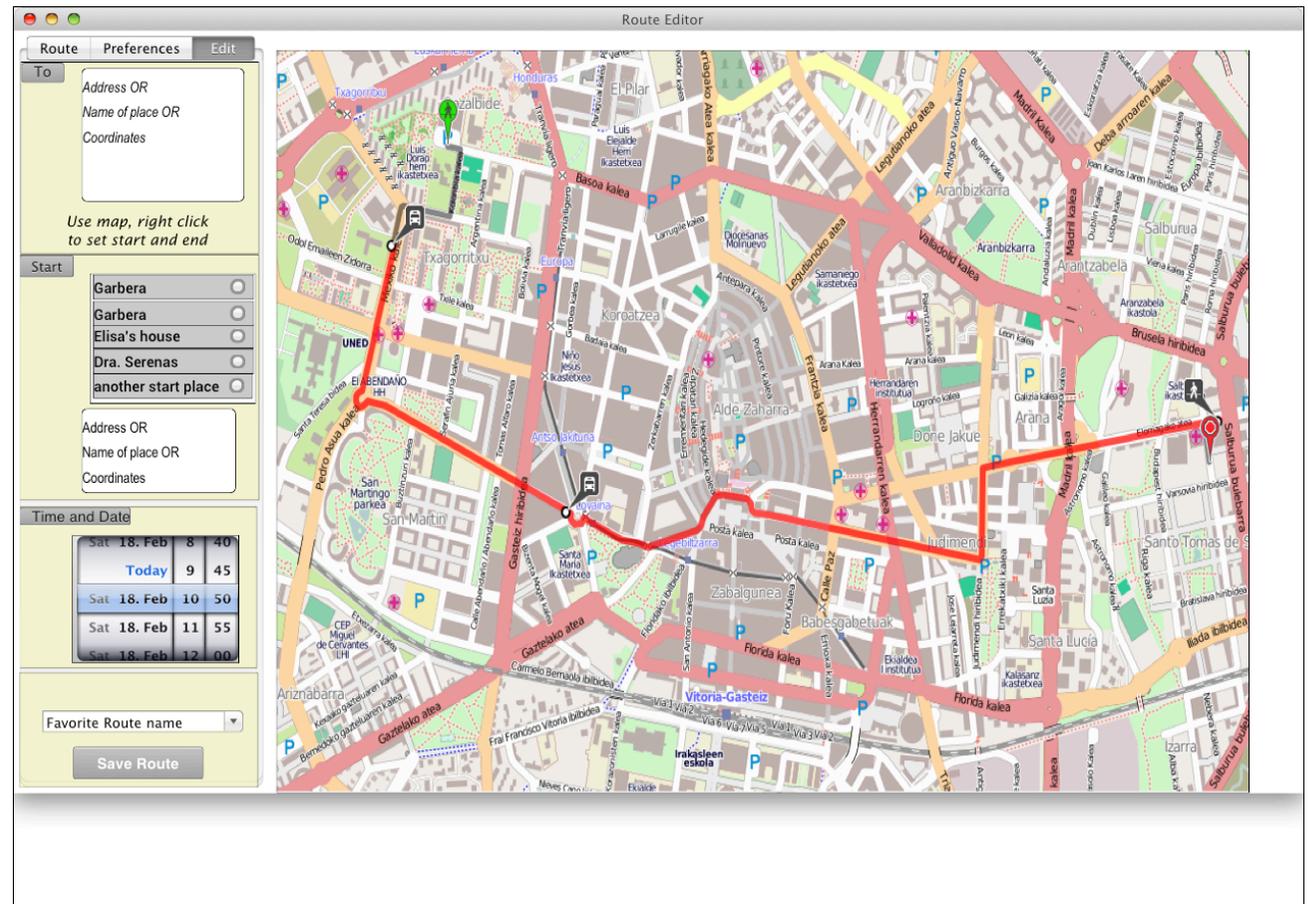
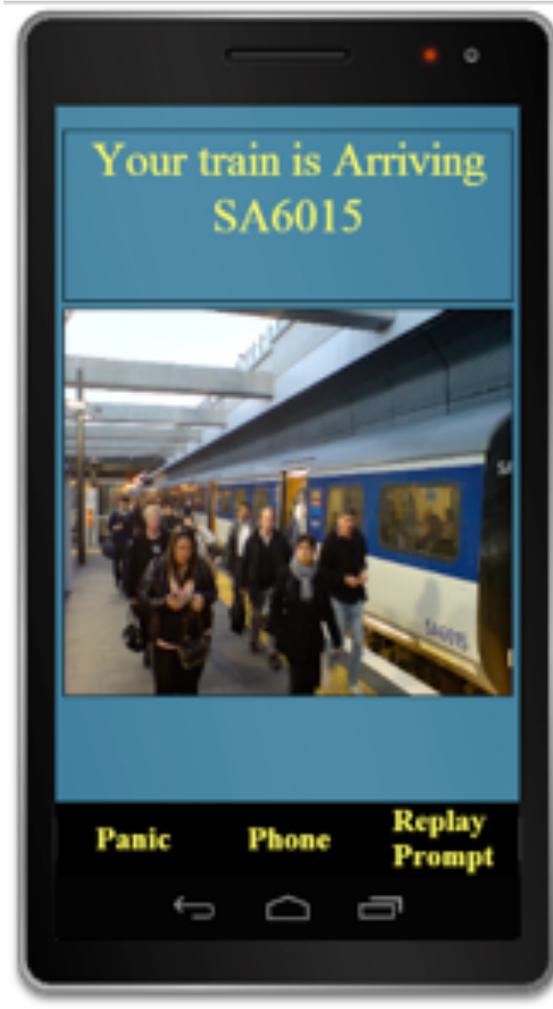
Set 1

Early design variations: These 3 were presented to an elder focus group and provided support to final design



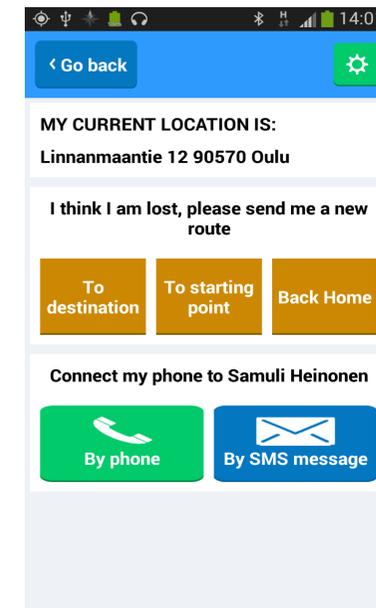
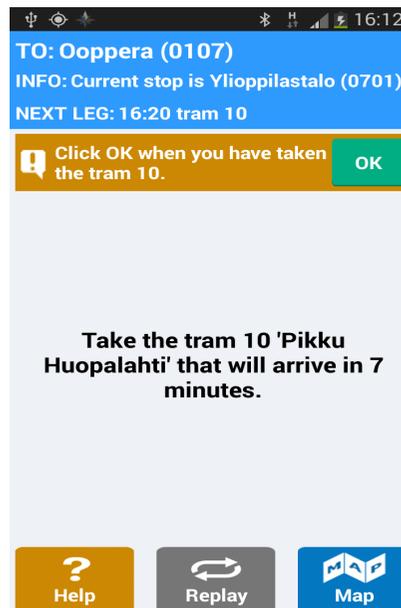
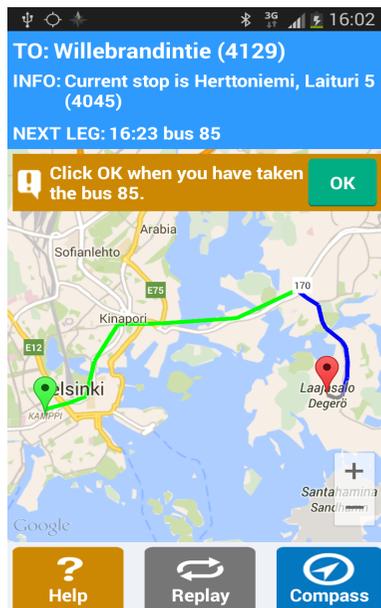
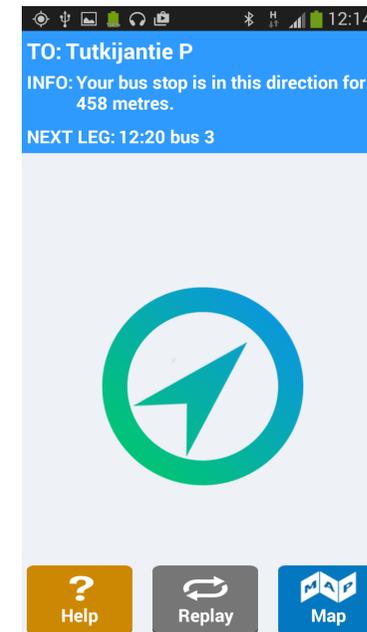
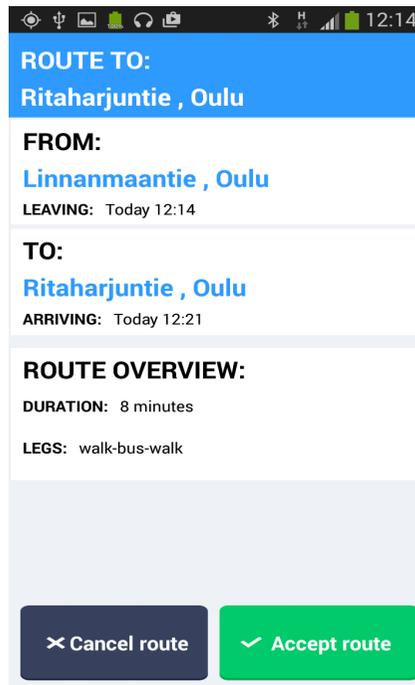
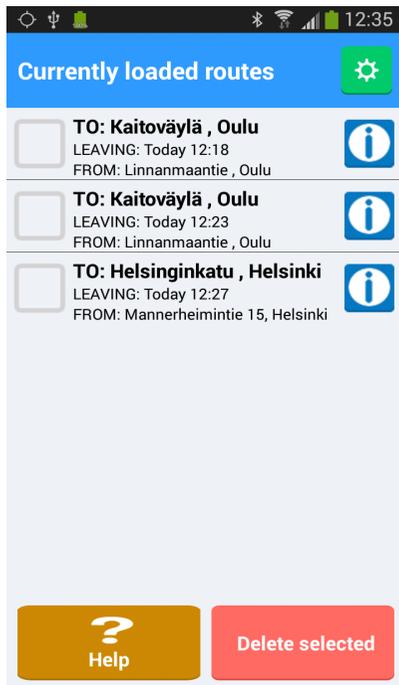
Set 2

Early design variations: These 3 were presented to an elder focus group and provided support to final design

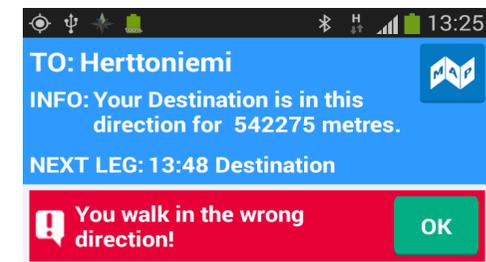
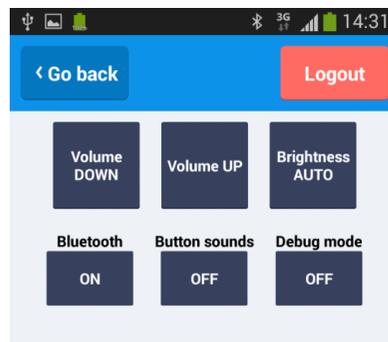
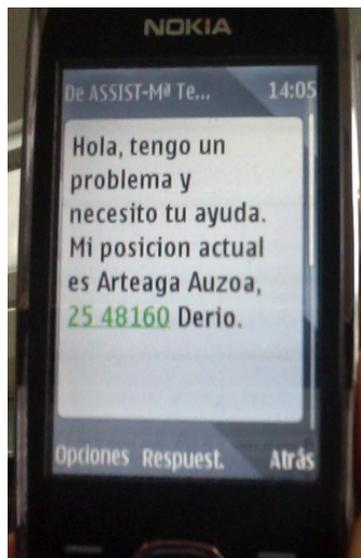
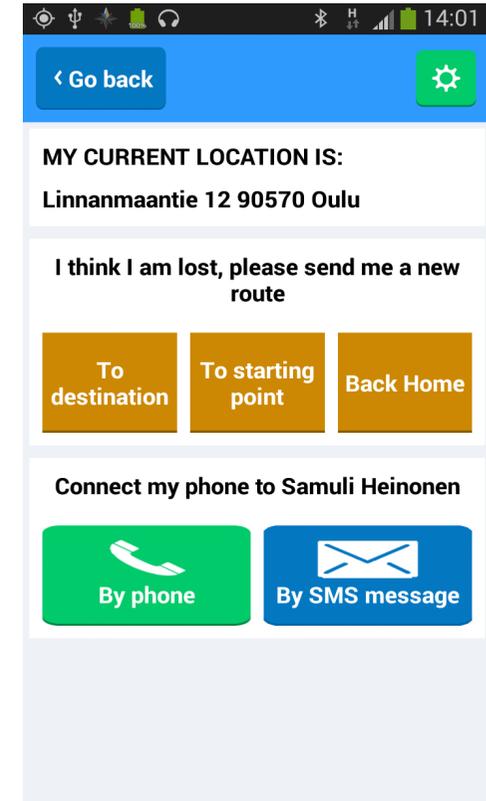
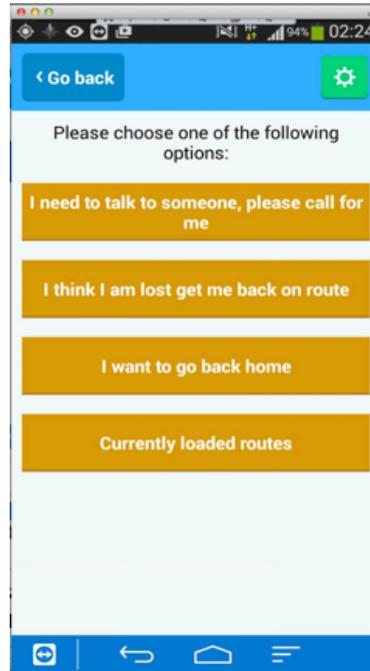
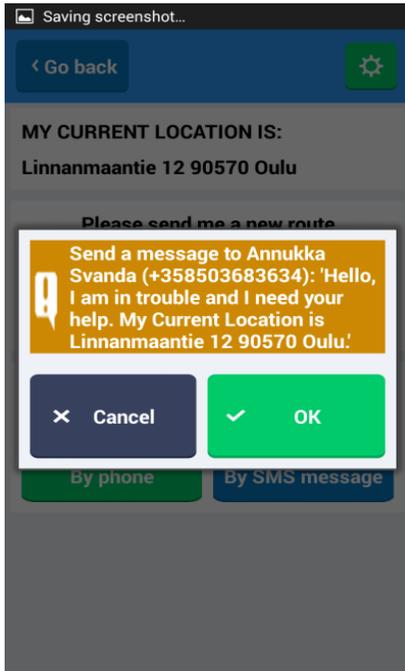


Set 3

Final Personal Navigation Device application



Final Personal Navigation Device application 2



Final web based route editor – route creator

HOME ROUTE PLANNER MY INFORMATION PREFERENCES CONTACTS Welcome, stefantec Sign Out

Create route

From Mikeletegi 12, San Sebastián, Spain

To Boulevard Zumardia, San Sebastián,

Date Today 26-5-2015 Tomorrow

Time 16 29 Departure time Arrival time

Create route for me

Save for next time

Travel time 27.7 min Walking 0.6km

Send to mobile

Map data ©2015 Google, basado en BCN IGN España Terms of Use Report a map error

Final Web Based route editor preferences page

HOME ROUTE PLANNER MY INFORMATION PREFERENCES CONTACTS Welcome, stefantec ✕ Sign Out

Preferences

USER THEME

- Typical Senior
- Typical Adult
- Tourist
- Mobility Disability
- Visual Disability

DISABILITIES

Visual

- Blind
- Need very large text
- Need large text
- Partially Sighted
- Good vision

Mobility

- Wheelchair user
- Need cane or Zimmer frame
- Very slow walker
- Slow walker
- No mobility problems

Save and finish

ALERTS

- Audio
- Vibrate
- Full screen blink

- Play alert till confirmation
- Invert screen
- Ambient lighting adjustment
- Alarm on lost GPS
- Alarm on lost mobile data
- Alarm on lost phone service
- Audio PC confirmation beep
- Audio confirmation on mobile device
- Confirmation by vibration on mobile
- Active Map Zoom controls

ROUTE SETTINGS

Maximum number of stops in route

REPEAT THE PROMPT

Number of times Repeat after (1-3 seconds)

TOUCH SCREEN DELAY

Touch screen delay on

Touch screen delay (1 - 5)

WALKING DISTANCE

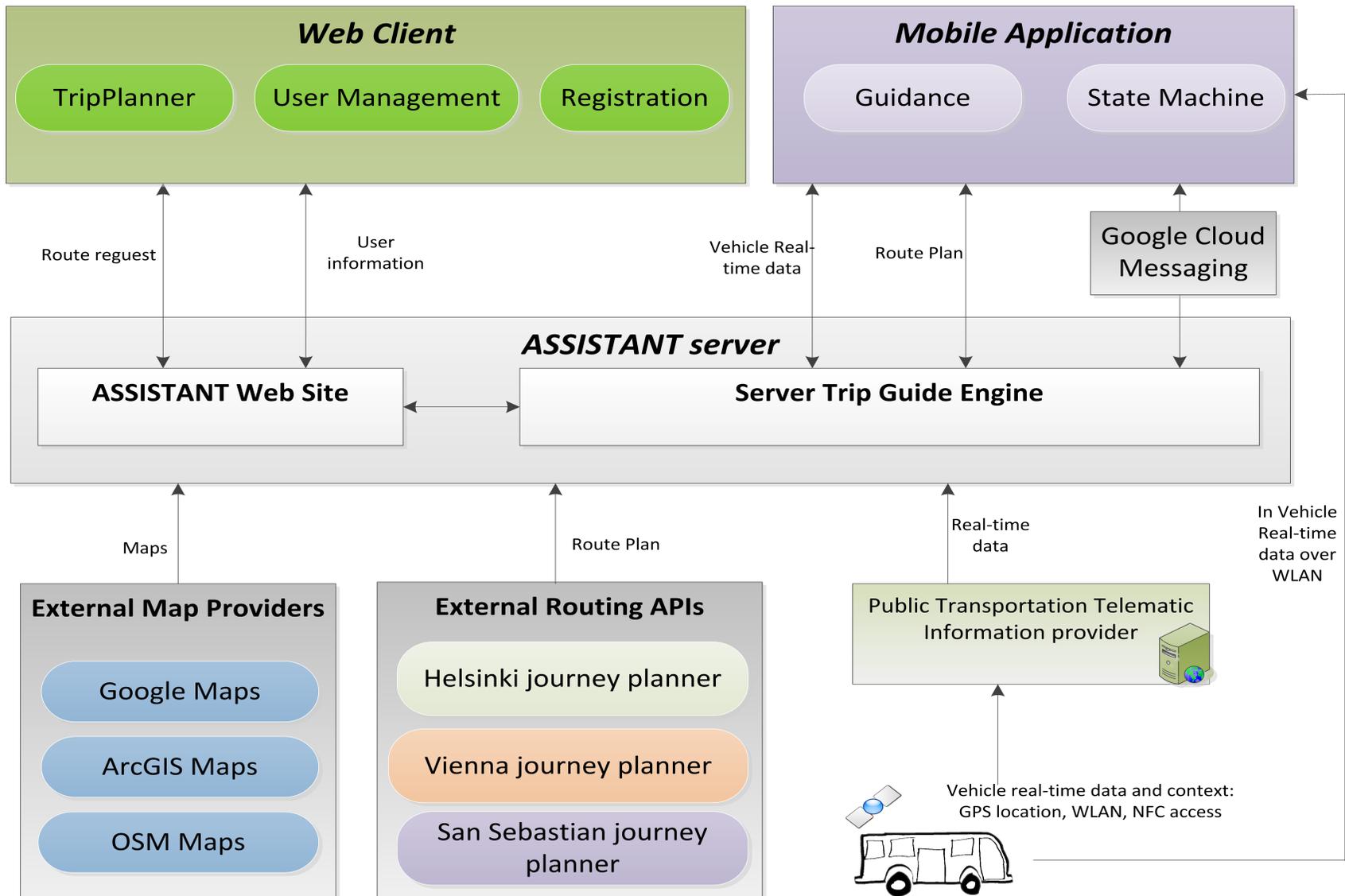
Maximum distance to walk (meters)

TIME TO EXIT HOME

Delay before exit (minutes)



ASSISTANT system overview



Note: I did the very high level design of this final design – another partner implemented it (modified and improved)

A children's demonstration of how a Hard Drive works (1990)

- In undergraduate school I designed and fabricated a 2 byte capacity hard drive out of a Fischer-price turntable, fabricating the read head arm with led and a sensor encoding the data (2 characters) using a leather punch and polar graph paper.
- The software was written in assembly language and run on an HP emulator
- Entering commands on the emulator started the motor, and when it was spun to speed, read the encoded data, displaying the two characters on the emulators monitor
- The project used trailing edge reading of the encoded punches, a result of experimentation and improvement (and leading to understanding of an important digital concept)
- This was done as a result of my then 5 year old daughter asking what a hard drive is and how it read and wrote data
- Unfortunately the design diagrams and documentation was lost in several moves, but it's a good example of my skill at translating concepts and designing systems to fit the understanding of the enduser without losing the essentials of the concept.

Source papers

- MAPS:
 - Carmien, Stefan, *Leveraging Skills into Independent Living- Distributed Cognition and Cognitive Disability*, VDM Verlag Dr. Mueller e.K., 2007, ISBN 978-3-8364-2006-8, 256 Pages.
 - Carmien, S. P. and Fischer, G. (2008). Design, adoption, and assessment of a socio-technical environment supporting independence for persons with cognitive disabilities. In *Proceedings of the Twenty-Sixth Annual SIGCHI Conference on Human Factors in Computing Systems* (Florence, Italy, April 05 - 10, 2008). CHI '08. ACM, New York, NY, pp. 597-606
- EU4ALL:
 - Carmien, S. and Cantara, A.M., (2012) “Diagnostic and Accessibility Based User Modelling” in Martin, E, Haya, P.A., Carro, R.M. (Ed.), *User Modeling and Adaptation for Daily Routines Providing Assistance to People with Special Needs*, Series: Human-Computer Interaction Series Martín, Estefanía; Haya, Pablo A.; Carro, Rosa M. (Eds.), Springer, 2013, 232 p. 54 illus.
- Assistant
 - Carmien, S., Heinonen, S., (2016) “Assistant, a Support Tool for Elders Using Public Transportation” (case study), in Finn, K., and Johnson, J.,(eds), *Age-Friendly Design Guidelines for Digital Technology*, Elsevier (in press)
 - Carmien, S. and Garzo, A. (2014) “Elders using smartphones – a set of research based heuristic guidelines for designers” in *16th International Conference on Human-Computer Interaction (HCI 09)* in the parallel session “Cognitive Accessibility and Cognitive Support” in the *8th International Conference on Universal Access in Human-Computer Interaction (UAHCI)*, 22 - 27 June 2014, Creta Maris, Heraklion, Crete, Greece, Springer LNCS, *Lecture Notes in Computer Science Volume 8514, 2014, pp 26-37*

More here: <http://scarmien.com/papers/CV.pdf>