

# **XML Based Multimodal Interfaces on Mobile Devices in an Ambient Assisted Living Scenario**

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# Summary

Introduction

Problem Statement – Elderly People

Problem Statement – Graphical User Interface

Problem Statement – Speech User Interface

XML Based Multimodal Interface Description

A Possible Ambient Assisted Living Scenario

Future Plans

# Introduction

Mobile devices are more and more

- cheaper

- 'smarter' (better performance, larger storage)

Mainly graphical user interface

Other modalities are not exploited

# Problem Statement – Elderly People and Speech Modality

Many of them are not familiar with traditional computer interfaces (e.g. keyboard)

Impaired vision and/or motor impairments

Moving around with a device

# Problem Statement – GUI

Difficulties of applying GUIs on mobile devices

Different platforms

Different layouts:

- PDAs (Personal Digital Assistants)
- Symbian and Microsoft mobile phones with keypad
- Mobile Phones with a touchscreen

# Problem Statement – SUI

No standardized speech I/O.

New type of tasks in multimodal way  
(handling complex series of events, e.g. going to bed)

Old tasks may be improved by multimodality  
(e.g. control the television)

GUI and SUI: Complete or compete?

# XML Based Multimodal Interface Description

3rd Party Application

Different Modalities

GUI

TTS

ASR

SUI

**Main Module**

XML Interpreter,  
Processor and Interface  
(Dinamically Linked Library )

XML User  
Interface  
Description  
File

# XML Based Multimodal Interface Description - GUI

## XML

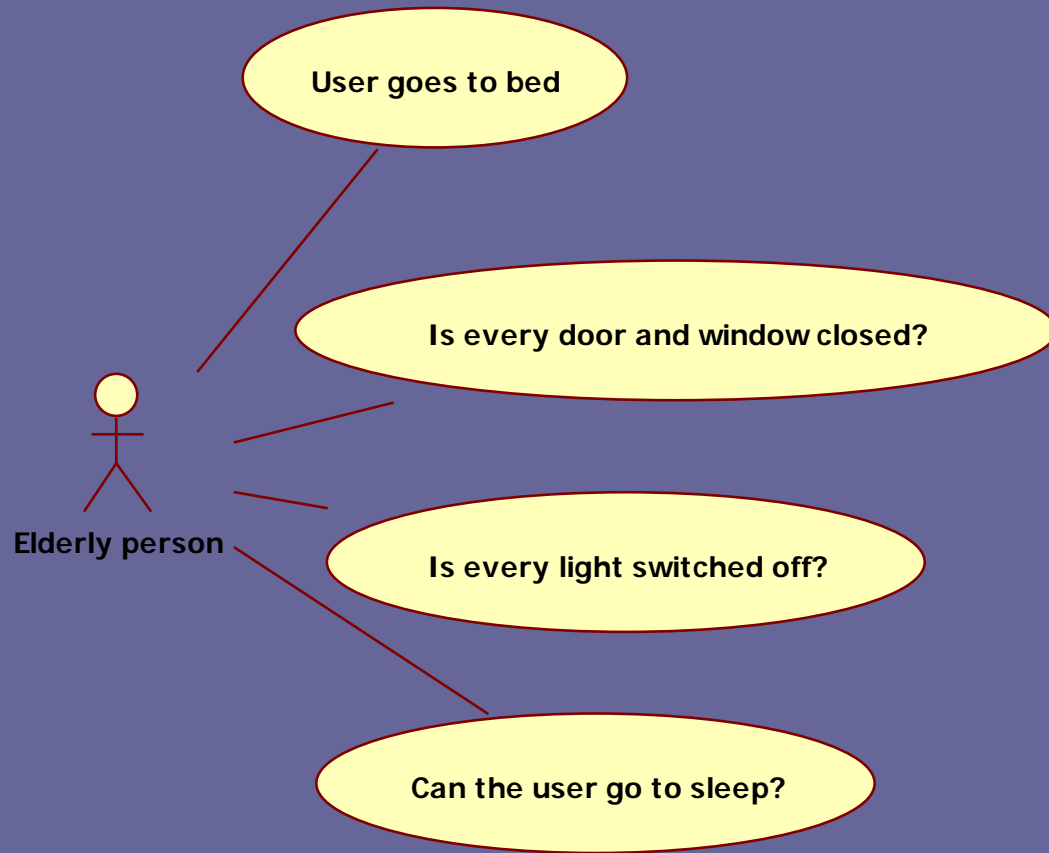
- Platform definition (WM, Symbian)
- User control definition
- User control common features
- User control specific features

# XML Based Multimodal Interface Description - SUI

## XML

- BelAmi framework
- Dialog based SUI
- Basic functions, complex tasks
- TTS: help, utterance before and after (acknowledgement) ASR
- ASR: answer, acknowledgement

# A Possible Ambient Assisted Living Scenario



Simple, but new task.

User controls (S+GUI):

- Button
- Label
- Image

# A Possible Ambient Assisted Living Scenario

User goes to bed

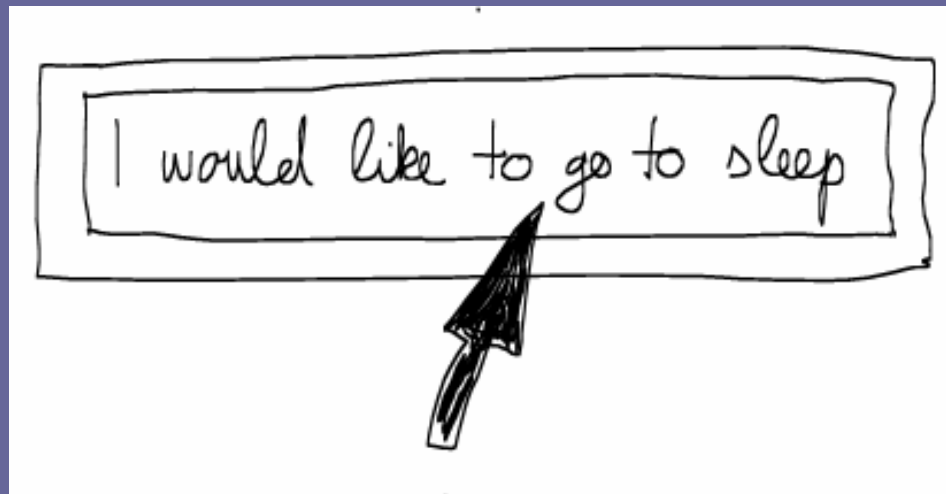
User goes to bed

**BUTTON**

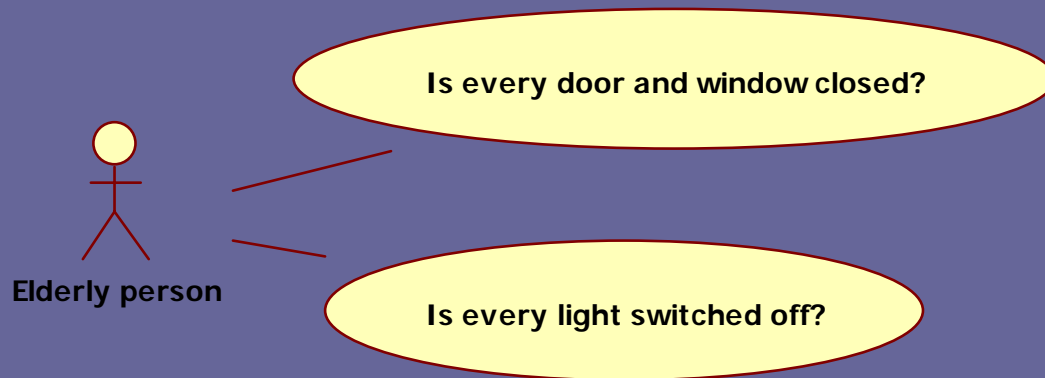
**ASR**



Elderly person

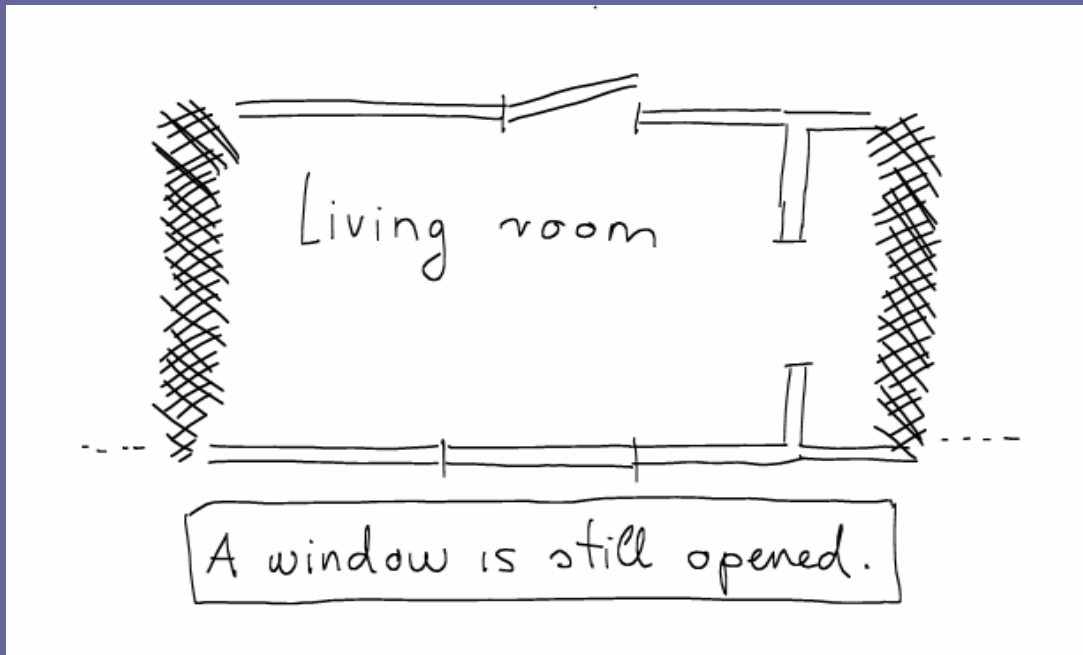


# A Possible Ambient Assisted Living Scenario



Is every door and window closed?

Is every light switched off?

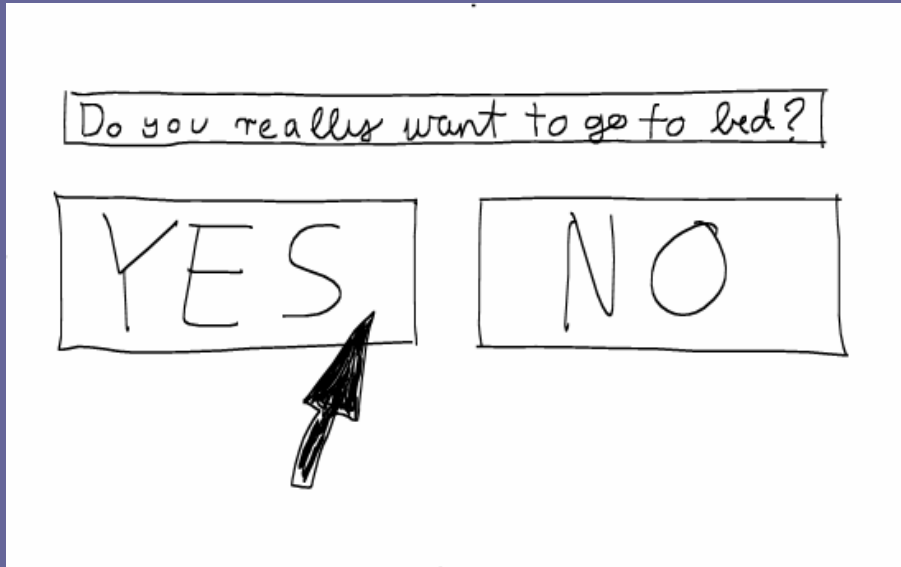


IMAGE

LABEL

TTS

# A Possible Ambient Assisted Living Scenario



Can the user go to sleep?

LABEL

TTS

BUTTON

ASR



Elderly person

Can the user go to sleep?

# A Possible Ambient Assisted Living Scenario - GUI

```
<object type="Label" id="1">
  <layout enabled="true" visible="true">
    <size width="30" height="20" locked="false"/>
    <location x="0" y="26"/>
    <anchor top="true" left="true" bottom="false" right="false"/>
    <color back="#FFFFFF" text="#000000"/>
  </layout>
  <usercontrol>
    <text align="Center" text="Do you really want to go to bed?">
      <font>
        <fontname id="1"/>
        <fontsize>9</fontsize>
        <fontstyle>regular</fontstyle>
      </font>
    </text>
  </usercontrol>
</object>
```

# A Possible Ambient Assisted Living Scenario - SUI

```
<object type="label" id="1">  
  <dialog dialog_id="gotobed" next="yes_or_no">  
    <SUI_dialog>  
      <prompt>Do you really want to go to  
bed?</prompt>  
    </SUI_dialog>  
  </dialog>  
</object>
```

# Future Plans

- Multiplatform implementation
- Complex applications
- Desktop designer for SUI and GUI

**THANK YOU FOR YOUR  
ATTENTION!**

# XML Based Multimodal Interface Description - GUI

- Platform definition (WM, Symbian)
- User control definition
- User control common features
- User control specific features

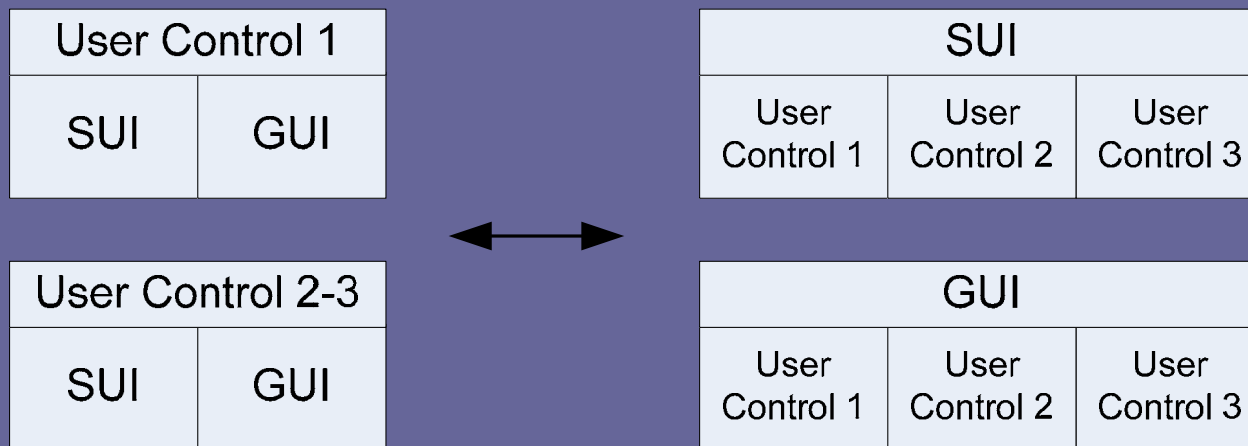
```
<platform type="PocketPC" >
  <object type="textbox" id="1" >
    <layout enabled="true" visible="true" layer="1">
      ... common features.
    </layout>
    <usercontrol>... 'UC' specific features.      </usercontrol>
  </object>
  <object ...>...
</object>...
</platform>
```

# XML Based Multimodal Interface Description - SUI

```
<platform type="desktop">
<SUI_settings> ... global settings.</SUI_settings>
<object type="textbox" id="1" >
  <dialog dialog_id="Input" next="Input">
    <SUI_dialog>
      <SUI_settings>... local settings.</SUI_settings>
      <waiting_for_userinput>
        ... ASR part.
      </waiting_for_userinput>
    </SUI_dialog>
  </dialog>
  <dialog ...>...</dialog>
</object>
<object ...>...</object>
...
</platform>
```

# XML Based Multimodal Interface Description - GUI & SUI

- Every user control may have one or more dialogs
- Blank user controls with dialogs are allowed
- The descriptions can be stored together or separately



# XML Based Multimodal Interface Description - GUI & SUI

- Interaction between the user and the UI
- Interaction between the modalities
- Platform independency
  - XSL Transformation (XSLT)
- Security issues
  - XML Schema verification
  - Later: definition file encoding