ANDROID WITH WEB SERVICES IN USER INTERFACE COMPONENTS

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Abstract— A system for mobile office and entertainment applications was developed. The input modalities include touch screen and automatic speech recognition, the output modalities screen output and speech synthesis. Services comprise an e-mail reading and responding application, a configurable news feed reader and, as entertainment, a license plate information application. Android Technology with web services has gained popularity recently in the mobile Application market. The present problem is impossibility of operator’s movement from the BMS Control center Now the solution was bought up by using android technology and web services. The aim of this project is remote access of alarms and acknowledging those using android application and web services.

Keywords—Android Architecture, Web services, UI Component, Speech Synthesis.

I. INTRODUCTION

In modern large scientific and industrial facilities, more and more information is needed due to the rising capabilities of the electronics and computing devices. For this reason, communications must be assured in every place of the facility. And this must be done in a reliable, fast and secure way. At this point cables seem to be the perfect solution. But when they are not really needed for performance reasons, wireless is a good option for monitoring and control. Wireless communications offer many advantages as reduced costs, mobility, scalability and ease of maintenance. Several wireless solutions such as ZigBee [10],Bluetooth [3] or WiFi can be found on the market. The EEE 802.11 standard for WLAN, WiFi, is a very flexible technology, easy to implement, cheap and provides a wide bandwidth. For these reasons, it has been implemented in large-scale systems, as presented in [11]. However, security can be a big drawback for t A system for mobile office and entertainment applications was developed. The input modalities include touch screen and automatic speech recognition, the output modalities screen output and speech synthesis. Services comprise an e-mail reading and responding application, a configurable news feed (RSS) reader and, as entertainment, a license plate information application. Being conceptually eyes and hands-free, the main target application is the car domain, but as a native android application it runs also on every Android based mobile phone. We report on the software structure and a framework for the integration of speech resources into Android based software, describe the functionality of the services e-mail, RSS and license number information, report on the design concept of multimodal usage, explain integration, evaluation and tuning of speech recognition as well as synthesis and conclude with a description of the evaluation user tests.

II. RELATED WORK

Linux kernel

At the bottom of the layers is Linux - Linux 3.6 with approximately 115 patches. This provides a level of abstraction between the device hardware and it contains all the essential hardware drivers like camera, keypad, display etc. Also, the kernel handles all the things that Linux is really good at such as networking and a vast array of device drivers, which take the pain out of interfacing to peripheral hardware.

Libraries

On top of Linux kernel there is a set of libraries including open-source Web browser engine WebKit, well known library libc, SQLite database which is a useful repository for storage and sharing of application data, libraries to play and record audio and video, SSL libraries responsible for Internet security etc.

Application Framework

The Application Framework layer provides many higher-level services to applications in the form of Java classes. Application developers are allowed to make use of these services in their applications.
Applications
You will find all the Android application at the top layer. You will write your application to be installed on this layer only. Examples of such applications are Contacts Books, Browser, and Games etc.

Additional Components
There are additional components which will be used in the construction of above mentioned entities, their logic, and wiring between them. These components are

<table>
<thead>
<tr>
<th>Components</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fragments</td>
<td>Represents a portion of user interface in an Activity.</td>
</tr>
<tr>
<td>Views</td>
<td>UI elements that are drawn on-screen including buttons, lists forms etc.</td>
</tr>
<tr>
<td>Layouts</td>
<td>View hierarchies that control screen format and appearance of the views.</td>
</tr>
<tr>
<td>Intents</td>
<td>Messages wiring components together.</td>
</tr>
<tr>
<td>Resources</td>
<td>External elements, such as strings, constants and draw able pictures.</td>
</tr>
<tr>
<td>Manifest</td>
<td>Configuration files for the application.</td>
</tr>
</tbody>
</table>

Table 2.1. Additional Components

IMPLEMENTATION TOOLS
In the present paper we developed front end application using eclipse and android sdk 2.2. we used SQL Server 2005 as a back end to store alarms. Here web Services are developed in java using eclipse. Alarms table are present in SQL Server which stores alarms generated by various systems. The alarm table contains Serial Number, Alarm name, category, Date of occurrence, time, status and acknowledgement fields. Here status specify about the level of emergency.

III. ALARMS WEBSERVICES AND CLIENT
The remote access to BMS Alarms which are stored in SQL Server is possible through web services [8]. We created such web services using java and with the help of Eclipse. The web methods in the present web service are “Alarm Retrieve”, “Login” and “Acknowledge” methods. The login method takes 2 arguments i.e. Username and Password and Alarm Retrieve method takes 3 arguments i.e. From Date ,To Date and acknowledge both these arguments of type String whereas acknowledge is of type Boolean. This methods takes three arguments i.e. the Serial Number, Alarm Name and Category Whenever the Login information is filled and user press the submit button.

There components run invisibly updating data sources and visible activities and triggering notifications. Content providers are sharable data stores. We use intents for simple message passing among activities. By creating and registering Broadcast Receivers the application can listen for broadcast intents that match specific filter criteria.

![Figure 3.1 Login Page](image)

Service Description:
Using embedded ASR and TTS on the Android platform, both in German and English language, the following services have been implemented as demo show cases. These services can be used via a multimodal user interface.

**News:** It enables the user to listen to RSS headlines and short news items. The service can be configured by selecting the RSS channels.

**E-mail:** This use case enables the user to listen, answer, forward, search and delete emails. E-mail answering is not yet possible by speech-to-text but by recording voice messages which get sent as e-mail attachments.

**SMS:** The user can listen, forward, search and delete his SMS via a multimodal user interface similar to e-mail and news service. Answering SMS is not yet possible.

**License number information:** As an entertainment application, one can speak or type the license letters and retrieve the correspondent county name and plate on the display.

IV. APPROACHES TO USER INTERFACE DESIGN
Restricted basically to in-car functionality and entertainment (Radio, MP3, CD) in the past, by now more and more complex
functionality like communication, telematics or navigation enters the car. This increasing complexity of in-car functionality causes also increasing requirements to the automotive human machine interface (HMI). Of fundamental importance for the adaptation of services for in-car usage is the reduction of mental overload and driver distraction in order to avoid crash risk. Ongoing developments in speech recognition, speech-to-text and text-to-speech technology allow adapting the conventional, touch screen based HMI for in-car usage. Two different device classes have been targeted: the integration of a smart phone into the car and a head unit based approach.

The described multimodal approach for an automotive HMI is based on a voice user interface (VUI), focused to the driver, while driving his car, and a graphical user interface (GUI), based on a touch screen and intended to be used in calm traffic situations, in the parked car or by the co-driver. Both input modalities, speech commanding as well as pointing gestures on the touch screen, are for the user at any moment available.

User driven interaction

The user is able to interrupt acoustic system prompts whenever he wants in order to enter his voice command by a push on the push-to-activate control on the steering wheel. But the user isn’t forced to answer a system prompt immediately. If the user has lost orientation about the state of interaction, because he has interrupted the interaction for a longer time, he is able toTopic: Thinking Aloud Method In Empirical and Theoretical Research. In P.A. Hancock & Meshkat (Hrsg.), Human Mental Workload, 139-183, Amsterdam (NL): Elsevier. Java Community Process: Java Speech API JSR 113 http://jcp.org/en/jsr/detail?id=113

Formant-synthesis: speech synthesized by physical models (formants are resonance frequencies in vocal-tract). Very flexible and smallest footprint, but very unnatural due to insufficient models.

Dip hone-synthesis: speech concatenated from dip hone-units (two-phone combinations), prosody-fitting done by signal-manipulation (depends on unit-coding). Relatively small footprint but not very natural.

Non-uniform unit-selection: best fitting chunks of speech from large databases get concatenated, minimizing a double cost-function: best fit to neighbor unit and best fit to target prosody. Sounds most natural (similar to original speaker), but inflexible with respect to out-of-domain words and large footprint.

In this project, non-uniform unit-selection was used because it clearly sounds most natural and it would be hard for customers to accept lower quality. In order to find the best quality from several bidders with respect to our application, we performed several listening tests:

V. CONCLUSION ANF FUTURE WORK

The developed concept and implemented applications enable a safe and enjoyable use of internet and online-services in vehicles. The key challenge, to bring more applications to the car which are usable during drive and understandable without guidance, is a well-designed user interface. Within the Connected Live and Drive project such user interface was developed, focusing the goal to keep the handling simple and intuitive, supported by state of the art voice technologies like speech recognition and high quality text to speech added by touch screen interactions. The concept idea of Mobile Office and Entertainment System based on Android was implemented on different Android based devices like smart phones and a car specific entertainment unit (head unit).

References


