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Challenges and issues in Android Digitalisation

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ABSTRACT: This paper presents a group management system using Wireless Sensor Network (WSN) and smart phone devices. The proposed system was comprised of personal device based on sensor node of WSN, smart phone device which is used by group manager and web server. The sensor node called as personal device which is held by group members sends a data packet every 2 seconds to the manager device. The manager can check their group member's distance from him within a 30-Meter radius and battery residual quantity on the manager device. Manager device sends its latitude and longitude data from Global Positioning System (GPS) and information of personal devices to web server Cellular telephony has had a significant worldwide rate of acceptance, by year 2010it is estimated that 3.5B of the 6.s8B people in the planet will have access to cell phone. Smartphone devices such as iPhone, Blackberry, and those that support the Android operating system are progressively making an impact on society. In addition to their support for voice and text exchange, smartphones are capable of executing sophisticated embedded software applications, as well as provide a simple link to the Internet and its resources.

KEYWORDS: Group Management System, Wireless Sensor Network, Android, Dalvik virtual machine, Linux, open-source system, nJIT compiler.

I. INTRODUCTION

Recently, the great needs of Radio Frequency Identification (RFID) / Ubiquitous Sensor Network (USN) [2] is being increased in the field of service. Especially, Real Time Location System (RTLS) and Location Base Service (LBS) are in the lime light in the area of security and safety. Children been kidnapped or been lured away by strangers is continually increased in the statistics of National Police Agency in Korea. For parents or guardians, it is hard work to take care their children when they went to field trip [1]. Also, the tour guide spent much time and paid excessively attention to safety of tourists. About 3,800children under the age of eight go missing each year in Korea, from among 92% of them returned their home. However, 8% of them never met again their parents for at last therefore, a system which can secure them was required for parents and their guardians. Some similar systems such as kids finder using Bluetooth technology and group tour guide system with RFIDs and Wireless Sensor Networks (WSNs) was realized in several literatures [1-5]. And a group management application was also implemented on smart phone devices with Global Positioning System (GPS) data. Android is a software stack for mobile devices that includes an operating system, middle ware and key applications. Android's mobile operating system is based on a modified version of the Linux kernel. The increasing interest from the industry arises from two core aspects: its open-source nature and its architectural model. Being an open-source project, allows Android to be fully analysed and understood, which enables feature comprehension, bug fixing, further improvements regarding new functionalities and, finally, porting to new hardware. On the other hand, its Linux kernel-based architecture model also adds the use of Linux to the mobile industry, allowing taking advantage of the knowledge and features offered by Linux. Both of these aspects make Android an appealing target to be used in other type of environments. Another aspect that is important to consider when using Android is its own Virtual Machine (VM) [3] environment. Android applications are Java-based and this factor entails the use of a VM environment, with both its advantages and known problems. In computing, a solution stack is a set of software subsystems or components needed to deliver a fully functional solution, e.g. a product or service. Middleware is computer software that connects software components or some people and their applications. Software that provides a link between separate software applications. Middleware is sometimes called plumbing because it connects two applications and passes data between them. Middleware allows data contained in one database to be

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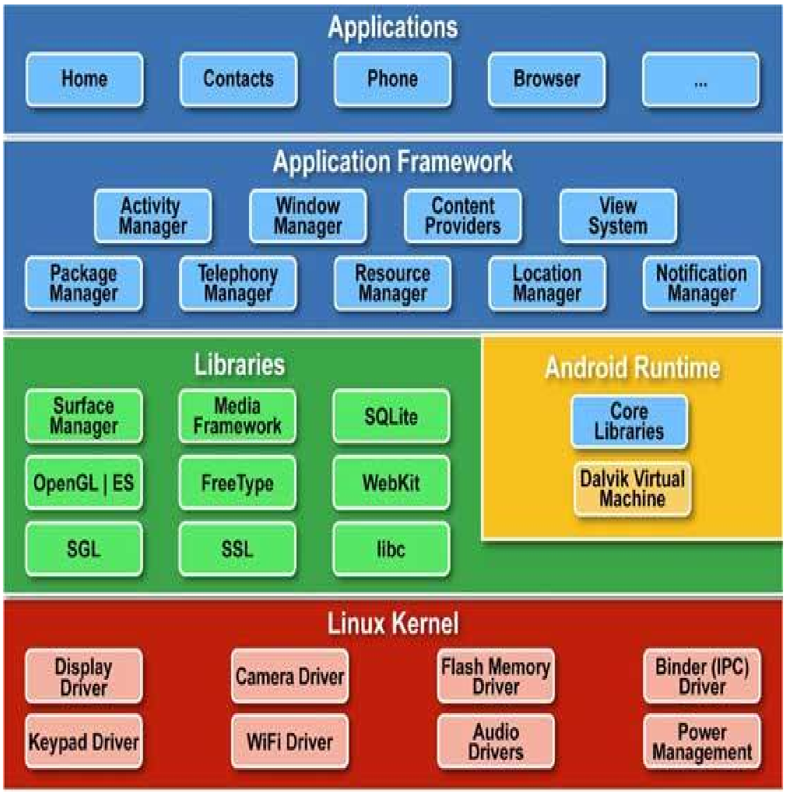
accessed through another. The Android open-source software stack consists of Java applications running on a Java-based object.

Android Architecture



Sends some data, the personal device operate sin RX or TX mode for low-power consumption. Above Figure describes a flow chart of personal device.2.2.Manager Device Since wireless communication was required [1] for the manager device and the smartphone users are increasing at an enormous rate, smart phone based on android platform was employed for the group manager in the system. Android platform is completely open source and free mobile platform. Therefore the application developers and smart phone manufacturers don't have to pay for license. Android System Structure The software structure of android can be split into four levels: the Application, the Application Framework, library and the android operation environment (Run Time), and operating system as shown in Figure. The android application program is a set of task. The task conducted by the application is known as activity. Comprising an activity and switching to other activities is possible in each screen. Through intent object ,changing activity and transmitting specific value to next screen is available [3].The base node receives status of each sensor node with particular packet as shown in Table2.The ID of sensor node, the number of packet from another sensor node, emergency situation and battery status in Table2is indicated by Node ID, Sequence_ Counter, Operation and Battery respectively. By providing an open development platform, Android offers developers the ability to build extremely rich and innovative applications. Developers are free to take advantage of the device hardware, access location information, run back ground services, set alarms, add notifications to the status bar, and much, much more. Developers have full access to the same framework APIs [2] used by the core applications. The application architecture is designed to simplify the reuse of components; any application can publish its capabilities and any other application may then make use of those capabilities (subject to security constraints enforced by the framework). This same mechanism allows components to be replaced by the user. Underlying all applications is a set of services and systems, including: A rich and extensible set of Views that can be used to build an application, including lists, grids ,text boxes, buttons, and even an embeddable web browser Content Providers [3] that enable applications to access data from other applications (such as Contacts), or to share their own data. A Resource Manager, providing access to non-code resources such as localized strings, graphics,

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and layout files A Notification Manager that enables all applications to display custom alerts in the status bar An Activity Manager that manages the lifecycle of applications and provides a common navigation back stack. For more details and a walkthrough of an application, see the Notepad Tutorial

Android Inc. acquired by Google:

Google acquired Android Inc. in August, 2005, making Android Inc. a wholly owned subsidiary of Google Inc. Key employees of Android Inc., including Andy Rubin, Rich Miner and Chris White, stayed at the company after the acquisition. Version history Android has seen a number of updates since its original release. These updates to the base operating system typically [1] focus on fixing bugs as well as adding new features. Generally each new version of the Android operating system is developed under a code name based on a dessert item. The most recent released versions of Android are: Android 1.5 (Cupcake) Android 1.6 (Donut):- (features) Most of the changes in 1.6 are behind the scenes, but users will be able to notice a few updates: Analysis of Android 1.6:The new Android 1.6 Market could be a game changer for users and developers alike. In 1.5, paid applications were hidden from users behind an obscure menu option. But in 1.6 they will be brought to the forefront. By exposing users to high-quality paid applications, the Market should see a surge in revenue which will encourage developers to produce even more and better content. For months the Android Market has lagged the iPhone app store, but 1.6 could put it on a path to change that.2.0/2.1 (Eclair), which revam ped the user interface and introduced HTML5 and Exchange ActiveSync 2.5 support. 2.2 (Froyo), which introduced speed improvements with JIT optimization and the Chrome V8 JavaScript Engine, and added Wi-Fi hotspot tethering and Adobe Flash support.

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 e-mails. E-mail answering is not yet possible by speech-to-text but by recording voice messages which get sent as email 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. The showcases were realized by Deutsche Telekom in cooperation with Continental to cover car specific applications like seamless navigation as well as the adaptation of the app store [2] idea or entertainment applications for in-car usage. The applications are meant to enable a safe and enjoyable use of internet and online-services in vehicles. Special emphasis is on closing the communication gap on the road by enabling highly complex communication services like e-mail, SMS or social networking for the user while driving. The realized show cases like news, e-mail- and SMS-reading demonstrate how the speech recognition and text-to-speech technology contribute to a significant reduction of driver distraction, because the driver isn't forced to [3] look away from the road any more. In contrast to the "touch only" human machine interface (HMI) the multimodal automotive HMI makes composing e-mail possible while driving. Other comprehensive services like e-mail-and SMS-dictate in car are envisaged based on speech to text technology and might be added at a later stage. Additionally, the integration of speech recognition helps to simplify applications like music search, address book search and license number search. It makes communication and entertainment much more comfortable and more fun for the driver while driving.

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 [2] 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. Figure displays screenshots of both interfaces. Smart phone [1] and head unit interface of e-mail service This section will outline how to build a multimodal interface, which is able to adapt services for in-car usage with simple but intuitive user interfaces and an adapted presentation.

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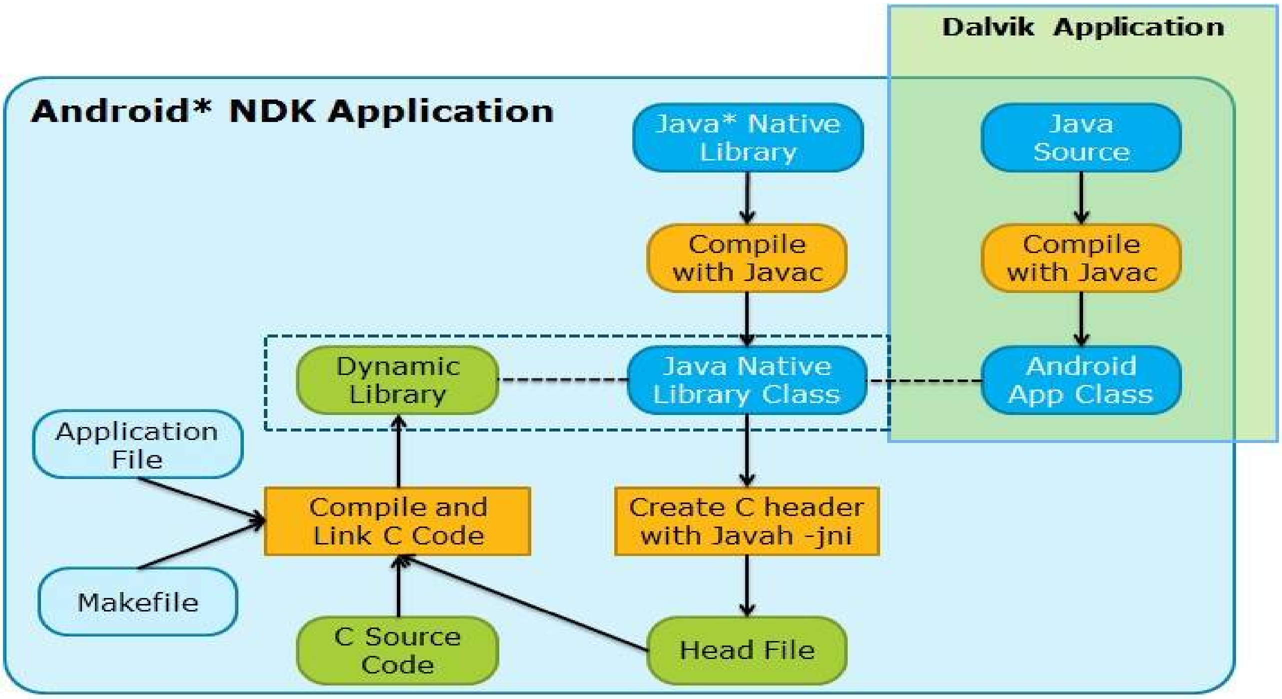

User Driven Interaction

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 to pick up the current task by executing a long term push on the push-to-activate control on the steering wheel. As reaction the system plays the context sensitive information about the current interaction step, where the interaction previously stopped. Furthermore the context sensitive information will be presented automatically whenever speech recognition fails.

Design Guidelines

Narrow menus, i.e. not more than 5 options per graphic, have to contribute to a reduction of mental overload and driver distraction. Graphical interaction components like buttons or fields have to reflect the associated voice commands. Feedback is given to each input [1] of the user. As reaction to a speech commands feedback and user guidance will be given by acoustic and graphic system output. As reaction to pointing gestures on the touch screen feedback and user guidance will be exclusively given by the touch screen. The audio prompting gives feedback about the state of the interaction and emphasizes the keywords, which mirror the current view of the touch screen. The audio prompting is as short and crisp as possible, in order to avoid annoyance in daily usage. The user of an in-car HMI is aware of the fact that he is speaking to a machine. Therefore speech recognition is focused on the recognition of single words and very short phrases, thus also contributing to an enhancement of robustness of speech recognition in the noisy in-car environment. Using the input modality speech, the user is able to select the requested task directly by saying the according voice command without taking he long way round the menu structure. Universal fall backs “Home” and “Back” are available for the case that interaction is deadlocked. The described multimodal HMI allows the user [4] to interrupt the human machine interaction at any time, when the traffic situation might require the driver's full attention, and to continue the interaction later, when the traffic situation is relaxed again. Based on a user driven interaction model, the VUI is able to play the leading part for the user, who is occupied with driving his car, and leads to a significant increase of comfort and reduction of mental overload and driver distraction.

Speech Recognition

A commercial ASR engine suitable for embedded platforms and especially automotive dashboard applications has been used to perform speech recognition and is integrated into the system by the afore mentioned Android Voice Framework (see chapter 3). The possible integration of a second ASR bidder is in preparation but not yet finished, performance

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comparison tests will then be carried out. Acoustic models for the 16 kHz sampling frequency are provided by the vendor together with the SDK. Additionally these models are optimized for in-car environments. Speech recognition for our application was integrated for two languages: English and German the grammars were written in a BNF like grammar format that is supported by the engine. Although the main scope of the ASR is to recognize short commands (e.g. “e-mail” or “news”) [5] also natural language understanding (e.g. “search for-mails from Marcus”) is supported. The second, not yet integrated, ASR maker uses grammars in JSGF format. The conversion is done automatically based on an AWK script. Based on the assumption that the user commands rely on the wording displayed on the graphical user interface (GUI) there is a strong correlation of GUI and VUI (voice user interface).The starting point for tuning the recognition accuracy was manual transcription. Those words that could not be found in the system dictionary provided by the vendor were added together with their phonetic transcriptions into an application specific user dictionary. A wizard-of-Oz test that might show what prospective users might say has not yet been carried out. To recognize the letters of the city/region prefix code in the license plate application we added a spelling grammar with 425 entries of one up to three letters (e.g. “d”, “d e” or “d e l”).An evaluation of recognition performance for German version of the ASR was made based on 9.078 samples. Because data from the application wasn’t yet available, a comparable (with respect to a command and control situation) dataset from a former project was used. In this data, about 30 users control their television with a voice interface. The test samples contain German TV stations (e.g. “MTV Music”, “Sat1” or “Das Erste”), categories (“science fiction”, “comedy”) and commands (“sound off”, “main menu”).Because this data was recorded in the participant’s living room, but the target application will mostly be used in a car, they were additionally mixed with street noise (from an ITU codec test suite), using a factor of 0.5. We didn’t use a common dB threshold for each sample because we think samples with a constant amount of noise but varying amount of information are more adequate for a real word situation. The recognition test was performed on all 9.078 samples using a grammar with about 150entries (TV stations, categories etc.). We decided to compute Command Success Rate (CSR) instead of Word Error Rate (WER) because for some of the TV stations there is more than one variant (e.g. “Erstes” and “das Erste”), and in contrast to speech-to-text services, the application is not about the exact wording but about recognizing.

II. CONCLUSION AND FUTURE WORK

Summary and Outlook

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, focussing 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.

REFERENCES

1. “Google Projects for Android". www.code.google.com. Google Inc. 2011. Archived fromthe originalon 2011-02-23.http://www.webcitation.org/5wiw1JXa2.

2. Chih.Yung Tsai, Shuo-yan Chou,andShih-Wei Lin,“Location-aware tour guide systems in museums”,Scientific Research and Essayas, vol. 5(8),2010,pp. 714-720.

3.P. Y. Chen, W. T. Chen, C.H. Wu, Y.–C. Tseng, and C.–F. Huang,“A group tour guide system with rfidsand wireless sensor networks”,International conference on Information Processing in Sensor Networks, 2007,pp. 561-562.

4.Tsung-Yu Liu, Tan-Hsu Tan,andYu-Ling Chu,“Outdoor natural Science Learning with an RFID-Supported Immersive Ubiquitous Learning Environment”,Educational Technology & Society, vol. 12, no. 4, 2009,pp.161-175.

5. Interactive media,
http://en.wikipedia.org/wiki/ Interactive_media.

6. Android (Operating System).
http://en.wikipedia.org/wiki/Android_(operating_system).

7. ASEAN community
http://www.asean.org/communities/asean-economic-community