

# Using Mobile Phones for Domain Specific Information Appliances

Albrecht Schmidt<sup>1</sup>, Enrico Rukzio<sup>2</sup>, Dominik Schmidt<sup>1</sup>

<sup>1</sup> Embedded Interaction Group, <sup>2</sup> Media Informatics Group, University of Munich  
 {Albrecht, Dominik}@hclab.org, Enrico.Rukzio@ifi.lmu.de



## Mobile Phones - A Versatile Platform

A wide variety of powerful mobile phones are available at low cost

### Extensive multimedia functionality

- camera for still images and movies
- sound recording and playback
- extensive storage capability
- voice and data connectivity

### Extensible with Bluetooth or WLAN

- mobile wireless printers
- GPS-receivers
- other mobile phone based appliances
- stationary computers

### Open to third party developers

- operating system level (e.g. C/C++)
- JAVA (e.g. JAVA 2 Micro Edition).
- APIs to multimedia and network communication

## Mobile Information Appliances

### Usage domains

- conductors on trains
- facility management, security personnel
- delivery personnel of parcel services
- traffic and parking police

Devices are designed for a specific usage domain. This makes such appliances only cost effective for large deployments.

Mobile workers often use paper and pens due to high costs of the development.

Typical tasks of mobile workers are information creation and access

Mobile phones are a platform alternative.

### Key Features

- processing and storage
- screen and audio for output
- mechanisms for user input
- printing facilities
- additional input mechanisms (e.g. card reader)
- network access and synchronisation

## Application and Evaluation

### Case study: Traffic Wardens

- specialized appliance
- printed parking tickets
- cases are archived

### Why a Prototype?

- Explore the concept
- Show practical advantages of such an approach
- Investigate the suitability of current hardware

### Advantages

- variety of form factors at low prices
- good general usability of devices
- user's familiarity
- good development support
- appropriate APIs
- short and long range network communication

### Redesign using a Mobile Phone

Basic considerations

- let the human do what they are good at
- optimize the overall process
- minimize errors and improve documentation



### Workflow

- human user judges the situation
- if there is a violation start a case and select a violation
- take a picture of the overall situation and of the number plate
- location data is automatically recorded via GPS using Bluetooth
- optionally provide audio comment
- transmit to server
- print a ticket via Bluetooth printer

### Implementation

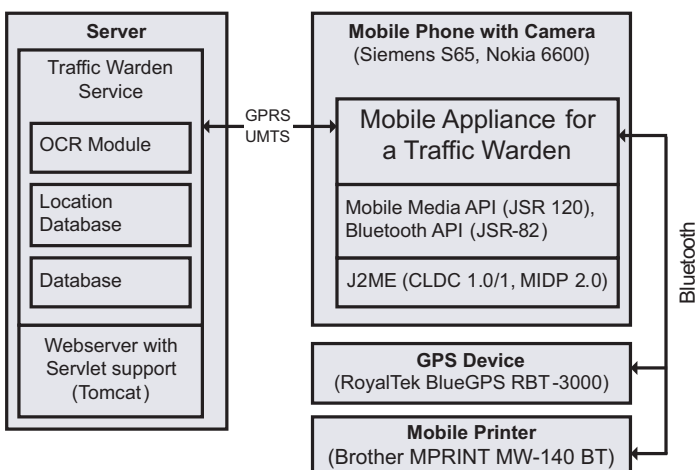
- two different mobile phones  
Siemens S65 and Nokia 6600
- GPS device RoyalTek BlueGPS RBT-3000
- mobile printer Brother MPRINT MV-140BT
- software implementation in JAVA

### Problems

- the battery time may be too short
- form factor (button and display size)

### Guidelines for Designing Information Appliances on Mobile Phones

- selection of the central device
- selection of additional devices
- make use of the capabilities to link the real world efficiently with the virtual world
  - accelerates the workflow
  - helps to prevent human errors
- restrict the functionality to support the task



### Acknowledgments

We thank the students T. Lang, K. Schreiber, C. Empl and J. Bahr for implementing the prototype, Brother for a MPRINT MV-140 BT and the Bayerischen Vermessungsverwaltung for the geographical dataset. This work was performed in the context of the DFG funded research group *embedded interaction* and IST Project *Simplicity* funded by the EU.