Mobia Modeler: An Adaptable Mobile Application Modeler for Non-Expert Users

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Outline

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Motivation

- Mobile phones
  - Changed the way people think and behave
  - Will become the primary computing platform
- Mobile applications
  - Success of the iPhone and App Store
  - Open platforms and SDKs

⇒ Development is restricted to programmers
Mobia Framework

- **Goal**: Enable non-programmers to easily build mobile applications
- **Domain**: Mobile health monitoring
- Domain-Specific Modeling (DSM)
- Mobia Modeler
  - Visualization, modules, export
- Mobia Processor
  - Processing, code transformation
Goals

- Enable non-programmers to easily develop mobile applications in the domain of mobile health monitoring
  ⇒ Mobia Modeler

- Create a tool to develop mobile applications that can adapt the user interface to the needs of non-programmers
  ⇒ Adaptation
Related Work

• Domain-Specific Modeling
• Integrated development environments
• Visual programming
• Prototyping
• Mobile health
Sample Application: Activity and ECG Monitor

- Username
- Password
- Login

Activity Monitor
- Lying: 10 min
- Sitting: 20 min
- Moving: 40 min

ECG Monitor

Personal Information

Stop
Reset
Mobia Modeler: Motivation

- Level of abstraction
- Modeling of logic
- Modeling of transitions
- Layout problems
- Input and output
- Devices and platforms
Mobia Modeler: Screen Management

- No manual adding of screens
- Instead implicit adding of screens
- Automatic creation of transitions
- Default screen
Mobia Modeler: Screen Layout

- No manual adding of user interface elements
- No WYSIWYG editing style
- Instead automatic layout of screens
- Impossible to create invalid combinations
Mobia Modeler: Adaptation

- Adaptable systems vs. adaptive systems
- Areas of adaptation
  - User interface adaptation
  - Content adaptation
- Wizard
  - Basic
  - Users
  - Devices
Mobia Modeler: Configurable Components

• **Definition:** A *configurable component* is a group of user interface elements with a clearly defined meaning.

• **Features:**
  – High-level
  – Configuration
  – Context
  – Validation
  – Devices and platforms
  – Learnability and usability
Mobia Modeler: Live Demo
Implementation

- Adobe Flex 3.3
- Adobe Flash CS3
- MXML
- ActionScript 3.0
- Mate Flex framework
  - Tag-based
  - Event-driven
  - Dependency injection
Evaluation: User Study

• Goals
  – Adaptation, workflow, user interface, feedback

• Participants
  – 16 participants: 6 programmers, 10 non-programmers

• Hypotheses
  – H1 Users with and without programming experience can build mobile applications equally easy
  – H2 Users are faster when the user interface is adapted
  – H3 User prefer the adapted version
Evaluation: Tasks

• Exploration
  – 5 minutes with subsequent questions

• Tasks
  – Building two sample applications in steps

• Feedback
  – Very positive
  – Concept understood
  – Good remarks
Evaluation: Results and Analysis

- **H1** Users with and without programming experience can build mobile applications equally easy
Evaluation: Results and Analysis

- **H2** Users are faster when the user interface is adapted

⇒ T-test showed no statistical significance
Evaluation: Results and Analysis

• **H3** User prefer the adapted version
  ⇒ 88% said adaptation is a good concept
  ⇒ 100% said the adaptable version is easier to use
Summary and Conclusion

- Mobia Framework
- Goals: Mobia Modeler and adaptation
- Sample application
- Mobia Modeler
  - Configurable components
- Evaluation
  - All goals achieved
  - Two of the three hypotheses confirmed
  - High acceptance
Future Work

• Mobia Framework
  – Integration of the Mobia Processor, more domains

• Configurable components
  – Improve components, more components, reflective configurable components

• User interface
  – Obvious adaptation, coloring system for groups

• Workflow
  – Simulation, plug-and-play for sensors
Questions and Discussion