

# Privacy-enhanced Intelligent Automatic Form Filling for Context-aware Services on Mobile Devices

Enirco Rukzio, Albrecht Schmidt, Heinrich Hußmann  
Ludwig-Maximilians-University Munich

[Enrico.Rukzio@ifi.lmu.de](mailto:Enrico.Rukzio@ifi.lmu.de)

medieninformatik  
LMU



# Motivation & Analysis of Services

- Why are mobile services so rarely used?
  - One answer: “It is complicate to input text.”
- Text entry on mobile devices is slow
  - particularly when inserting contact and payment data
  - predictive algorithms (T9) are not effective in this context
- Top 5 of three German mobile operators

	T-Mobile	O2 Germany	E-Plus Germany
Top 5 Services	1. Ring tones	1. Live chat	1. Ring tones
	2. Download games	2. eBay	2. Playboy
	3. Chat	3. O2 E-Mail	3. Sport news
	4. Soccer	4. O2 Ring tones	4. Poptone
	5. MMS-Services	5. O2 Games	5. eBay

- Often there are no forms provided
- Getmobile.de → They call you back.
- Booxtra.de → You can not order without an account.

# Analysis: Initial User Test

- 2 Versions of a reservation service
  - First: empty forms
  - Second: prefilled forms (2 errors)
- Task: Submit correct data, 3 runs
- Done by 8 people (colleagues)
- Predictable result:

	Empty forms	Pre-filled forms
1. run	240 seconds	60 seconds
2. run	170 seconds	37 seconds
3. run	115 seconds	33 seconds

- Conclusion
  - Automatic form filling for mobile devices is needed
  - People do not want to give away their data
  - Personal data + form filling on the mobile device

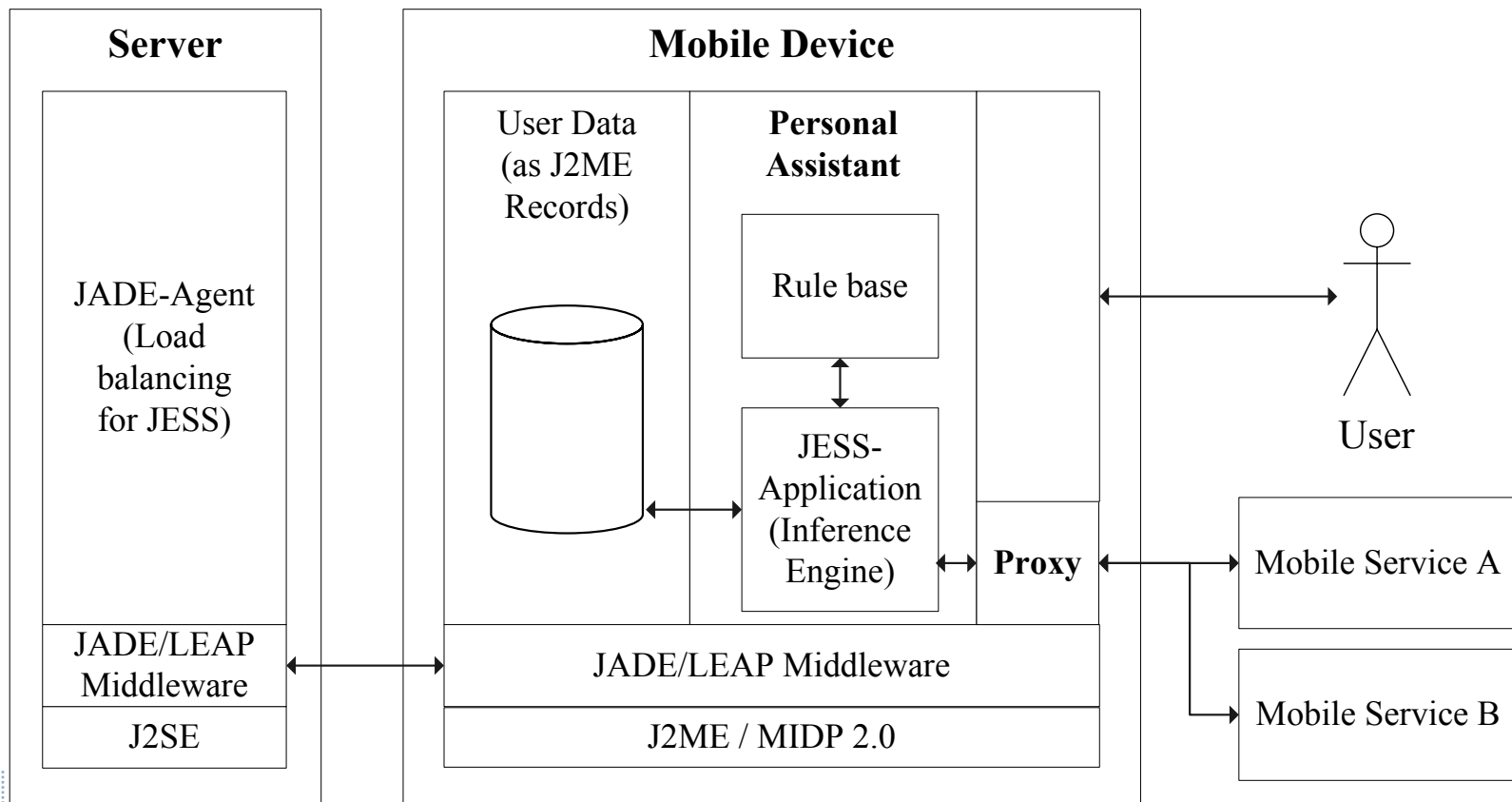


# Algorithm

- There already exist good algorithms and products.
  - We are adapting: T. Chusho et al. “Automatic Filling in a Form by an Agent for Web Applications”, APSEC 2002.
- Web form
  - `<input name="Name" type="text" size="20">`
  - Context (title of the page, field before and afterwards)
- User Data
  - XML structure based on the 3GPP Generic User Profile
- Concept names `@name={name, surname, name2}`
- Rules:
  - Cognitive rules
    - addressing the context of the field in the form
    - IF #upper ^ #left ^ #right ^ #lower THEN #action
  - Experimental Rules (Learning facility: extending the array of a concept name + creating rules)

# Architecture & Prototype

- Accessing forms through a proxy on the mobile phone
- Java Agent DEvelopment Framework / Lightweight Extensible Agent Platform (JADE/LEAP) as middleware
- Jave Expert Systems Shell (JESS) as rule engine



# Results + Future Work

- Results
  - J2ME proxy (Nokia 6600)
  - J2ME HTML parser for accessing the forms
  - JADE/LEAP is running on a Nokia 6600
- Future work
  - Finish the prototype
- What's new?
  - Application: Automatic form filling on a mobile device.
  - Technically: "Running" a rule engine on a mobile device.
- We will try
  - User studies based on the prototype:
    - What is their opinion about the prototype?
    - Would they accept such an intelligent assistant?
    - Is privacy really important?
  - Visualization of probabilities (e.g. through colors)