A Smart Shopping Assistant
utilising
Adaptive Plan Recognition

Michael Schneider, Universität des Saarlandes
8. Oktober 2003
Overview

- Smart Shopping Assistant
- System Architecture
- (Adaptive) Plan Recognition
- OPRES: Object-Oriented Plan Recognition
- Hardware Setup
- Demonstration
Smart Shopping Assistant  
(Motivation)

- Personal
  - Ubiquitous and transparent tool
- Mobile
  - Does not inhibit fun of strolling around
- Adaptive
  - Adapts to user’s preferences and experiences
  - Adapts to current context
Smart Shopping Assistant (Shopping Cart)
System Architecture

User

System

- Actions
  - Sensor Data
- Sensor Data Interpreter
- Plan Recognition Engine
  - Plan Library
  - Probabilistic Model
  - User Model
- Support Engine
  - User Support

User executes
provides
receives
Plan Recognition

• Shopping Assistant needs knowledge about
  – what the user wants/needs (Goals)
  – what the user is going to do (Plans)

• Plan Recognition
  – Observing the user‘s actions
  – Linking observations to goals and plans
Adaptive Plan Recognition

• Relations between actions and goals/plans depend on
  – User’s knowledge
  – User’s preferences
  – Other related context

• Plan recognition systems must explicitly take into account these factors!!
Characteristics & Requirements

- Uncertain knowledge and sensor data
  - Use probabilistic approach

- Concrete user and context model unknown at design time
  - Modular knowledge representation
  - Link at runtime
Object-Oriented Plan Recognition

- Specify user and context model as PRM (probabilistic relational model) classes
- Construct probabilistic model of inferred plan hypotheses at runtime by instantiation
- Calculate likelihood of certain plan hypotheses by evaluating the constructed model
OPRES (Object-Oriented Plan Recognition System)
Example Hypothesis Construction

Steps:

1. Observe user’s action and current context
2. Search plan library for explanations
3. Link new observations to existing explanations
Hardware Setup

- RFID (Radio Frequency Identification) technology is used to observe user actions
- All products are tagged with transponders
- Shelves and shopping basket are equipped with antennas and readers
- Interpret flow of objects between shelves and basket as manifestation of user actions
Hardware Setup (2)
Demonstration
The End

Michael Schneider
mschneid@cs.uni-sb.de

Universität des Saarlandes