Outline

- Types of Models
- HCI Models
  - Introduction
  - Variations
  - Characteristics
- Open Questions

Types of Models

- Exploratory
  - Observation -> Model
- Predictive
  - Model -> Prediction
User Model

Modelling Human

• Fitts’ Law, Hick’s Law, Marr’s model of Vision
• Command Language Grammar @ Xerox Parc
• Model Human Processor

HCI Models

• GOMS
• Formal Grammar
• Cognitive Architectures
• Mixed approaches
• Application specific models

GOMS

• Goal
  – Open a folder
• Operator
  – Move mouse
  – Click mouse
  – Press <enter>
• Method
  – Double click on the icon
  – Select the icon and press <enter>
  – Right click on the icon, select <open> from the pop-up menu
• Selection
Variations

• CMN-GOMS
  – The original GOMS

• KLM: the simplest one, no method, only 6 operators
  • Pressing a key
  • Moving the pointing device to a specific location
  • Making pointer drag movements
  • Performing mental preparation
  • Moving hands to appropriate locations, and
  • Waiting for the computer to execute a command.

• CPM-GOMS
  – Exploit parallelism in working

• NGOMSL, GLEAN…

Characteristics

• Serial processing (initially)

• Extensively used in HCI

• Expert performance

• Errorless performance

Formal Grammars

• Modelling language

• Operations -> Terminal symbols

• Interaction -> Set of rules

• Knowledge -> Sentence

Variations

• Task Action Language (TAL)
  – Minimizing size of grammar

• Task Action Grammar (TAG)
  – Consistency
  – Simple tasks
Characteristics

• Model competence, not performance
• Can model knowledge and learning
• Difficult to define a unique set of simple tasks

Cognitive Architectures

• Introduced in 1972 Carnegie Symposium
• Unified theories of Cognition
• Virtual human

Variations

• SOAR
  – Rule based system
  – Impasse and Chunking
• ACT-R
  – Hybrid architecture
  – Spreading activation
• EPIC
  – Perceptual and Motor processing
• CORE
  – Constraint satisfaction problem

Characteristics

• Can model any performance (Theoretically)
• Extensively used to model psychological experiments
• Need detailed knowledge of psychology
• Yet to be used to model complex interactions
  – Parameter tuning
Mixed Approaches

Simplicity of GOMS
+
Details of Cognitive Architectures

Variations

• Programmable User Model (PUM)
• ACT-R Simple…..

Characteristics

Lost Simplicity of GOMS
+
Lost Details of Cognitive Architectures

Application specific models

• Online recommender system
• eLearning system
• Web link prediction
Existing problems

Definitions

User - a complicated system

Diversity of applications

Partial picture
Existing problems

Who will use it

Open questions

• Optimum fidelity
  – Level of details

• What to model
  – Performance, Knowledge, Competence...

• When to model
  – User trial
  – More experiments...

Take away points

• Concept of user modelling

• Different kinds of user models
  – Their advantages and disadvantages

• Open research challenges in user modelling