Cognitive psychology → build Cog. Models

Cognitive Model

Aim: • further understand
• predict behavior

Role: early in design process
evaluate existing designs

What are cog. Models.
Diff. types of Cog. Models
Cog. Models ⟷ Human experiment
What are they used for Results.

types

① /

• general description of steps to complete task

[engineering Models]

GOMS — based on Human info processing & task analysis

predictive • aspects human performance w/ interface bf. introduced
• Evaluate interface designs

- Goals : aim of user
- Operators • possible interaction interface allows
- Methods • subgoals & operators
- Selection rules • Choose between Methods to achieving goals

Depends on many factors (in-external)
Represent by conditional statements If – Then

GOMS analysis.
Task → subgoals

Granularity — Hard to know where to stop & start
程度/詳細
In what detail / How much specify
High level goal.
↓
unit task / subtask

Spotting error ?

Example of GOMS
- Method for goal : copy paper
Subtask 1 — Method 1 ← process – return
Subtask 2 — Method 2
Subtask 3
Return goal accomplished

Keystroke-level Model

Restricted GOMS
• specify sequence of operators
Methods to perform a task.
• predict execution time.
- 8 standard operators [08-P30]

Can calculate which is faster by adding time in sequence of action

$\sum_{i=1}^{n} T(\text{actions})$ ↓ in the operator table

Require reliable estimates for actions

Limitation

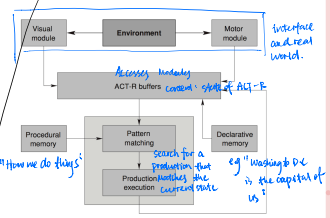
Assume:
{ well practiced
No error
No fatigue

⑤

• Simulation of users' performing task.

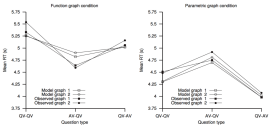
– Cognitive architecture
• provide explanation of cognition
• Architecture encapsulate psyco. theries
• Build Computational Model within Cog. architecture.
• Simulate interaction
• Artificial users – Compare designs
• Compare findings ⟷ human behaviour

ACT-R [1] Adaptive Control of thought – Rational [2]



Key points:
• Models various aspects of human cognition.
• Process rules ⟷ latency parameter
• Simulate: basic audio perception / Audio output
  • Attention shifts
  • Memory Activation/decay
  • Rational analysis
    ↘ how people choose actions

Comparison of Graphs
(2 types of graphical Representation)



Summary

- ☐ Cognitive models can be used in HCI to understand and predict human interactions with interactive systems
- ☐ They vary in type and level of detail
  - E.g. general descriptions of steps required to complete a task vs. simulations of users performing a task
- ☐ Models can be verified against human data