Pulling it all together, (starting to) the first several chapters of IST331

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For IST 331: The user

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Also see: www.crasar.org
Fitting the user to the machine vs. ....

- Anthropometric approach (Can it be used?)
- Behavioural approach (How is it used?)
- Cognitive Approach (How do they think they are using it?)
- Social issues (How about others when using it?)
What is Error?

- Big accidents
- Little accidents
- Normative vs. Descriptive
  "Error will be taken as a generic term to encompass all those occasions in which a planned sequence of mental or physical activities fails to achieve its intended outcome, and when these failures cannot be attributed to the intervention of some chance agency". Reason, 1990.
History how errors have been received

- They happen
- The machine broke
- The operator did it
- A complex series of mistakes happened, usually by more than one person
- Communication between team members broke down/can't cooperate
Causes

- Single operator's noisy, imperfect human hardware
- Social status vs. task problems, pardon me sir, but is that not an iceberg?
- Distractions
- State misidentifications, not in LA...
- Experts catch them
Individual's forms of errors

<table>
<thead>
<tr>
<th>Cognitive Stage</th>
<th>Primary Error type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning</td>
<td>Mistakes (failures of expertise or lack of expertise)</td>
</tr>
<tr>
<td>Storage</td>
<td>Lapses</td>
</tr>
<tr>
<td>Execution</td>
<td>Slips</td>
</tr>
</tbody>
</table>
Fixes for errors

- Make movement natural
- Is the knowledge consistent with previous knowledge?
- Is the response consistent with the stimulus?
- Is the state of the agents visible to other agents?
- Set pace appropriately [ruler demo?]
Learning

- Generally follows a powerlaw $T=N^{-\alpha}$
- So big speed up initially
- Lesser speed ups with time
- Performance time does not follow user’s description of it
- Users don't like being on fast slope (but for games)
- Changes in strategies put onto a new curve, typically with different intercept
Expertise

- About 10 years for world class
- Less for local/national class
- Requires deliberate practice
- Interesting to people
- Greater memory/attention/vision/knowledge/anticipation
- Prone to overconfidence, it anything
Problem solving

- When not an expert, or a casual user or a learner
- Task/action mappings help
- Has to be performed with IO tools you now know
Known Biases

- Plausibility is over done (it must be this error!)
- Prototypes can mislead (programmer and is active in the feminist movement)
- Relative ratios often overlooked
- Regression to the mean/sample sizes
  Restaurants are not as good the second time
Problems II with problem solving

- Single bad experiences cannot be generalized from
- Then confirmation bias
- Retrieval and perceptual fluency bias
  - Locality and knowledge: Ireland/Indonesia
- Based on mental models
  - Which are often naïve and wrong
  - Learn to live with them in your users' thermostats' speed
ACT-R/A/C

Challenge appraisal -> expected gain

- caffeine ->
  Greater cardiac output *

- Cardiac output ->
  Faster, better rule matching*

challenge -> greater cardiac output
threat -> other changes

Threatening -> worry production/task

OUTSIDE WORLD

Heart

Goal Stack

Current Goal

Goal Stack

Procedural Memory

Declarative Memory

Production

Retrieval Request

Action

Perception

Conflict Resolution

Transform Goal

Retrieval Result

Popped Goal

Push

Pop
*Output of Model in ACT-R/A/C

Output with appraisal1

Output with appraisal2

Output with Caffeine and appraisal

[Future Work]