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

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For IST 331: The user
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Turn in resumes
Get books
Read the syllabus

IF YOU ARE DESIGNING A SYSTEM FOR YOURSELF
YOU ARE THE USER
Fitting the user to the machine vs. ....

- **Anthropometric approach**
  (Can it physically be used?)

- **Behavioural approach** (How is it perceived?)

- **Cognitive Approach**
  (How do they think and think they are using it?)

- **Social issues**
  (How about others when using it?)
Overview of Chapters and Learning Opportunities

- Book for basics, foundations
  - 1 Intro, why, what, etc.
    - ABCS overview, ACT-R, structures to hold it in your head
  - 2 History, types of fields
  - 3 Anthropometrics, hands, mouse, Fitts
  - 4 Perceptual, behavioral, aspects
  - 5 Cognitive: Learning, memory, attention
  - 6 Cognitive: Mental reps, PSing, decision making
  - 7 Cognitive: HCC
  - 10 Errors: overview

- Other readings to see that details exist
- Labs to practice, experience, use these concepts
- Extra credits to make experience more personal or use timely or time-restricted resources
Chapter 2 on a slide

- History
- Related fields

Be able to define terms
Ch. 3 Anthropometric

- How bodies work
- How to sit
- Some feeling for keys & times
- Fitts law and its implications

- Help people sit
- Reduce movements
- Provide support
Chapter 4: Movies about Perception, and Motivation

- How eyes work and something about sound
- Definitions
- SDT
- Popout
- Depth cues
- Gestalt, other sections
- Simons’ gorilla movie
- Drive+crash [model of driving]

Help people see
Chapter 4: Motivation

- Maslov’s hierarchy
- Intrinsic and extrinsic motivation

Be careful with these in design
- Important
- Not fully understood
- Help people want to work
Ch. 5: Memory

- Types of memory
- How to use memory
e.g., PQ4R
- Biases

- Make things easy on memory
- Easy in, easy out
Ch. 5: Attention

- Attention is a limited resource
- If the system is doing one thing, it can’t be doing another. If it’s buffers are full of TV, it can’t process readings
- Keep the person apprised

→ Reduce needs for attention, and keep results as easy to remember as possible
Ch. 5: Learning

- Generally follows a powerlaw Time = N^{-\alpha}
  - Also add in constants, does not stop
- So big speed up initially
- Lesser speed ups with time
- Performance time does not follow user’s description of it
- Users seem to not like being on fast slope (except for games)
- Changes in strategies put onto a new curve, typically with different intercept
- Knowledge to skill to automatic

Assume people will learn
Not much faster for experts, may be fast enough

Much faster for experts, may be fast enough
Ch. 5: 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, if anything
Chapter 6: Problem solving

- When not an expert, or a casual user or a learner

- Task/action mappings help

- Has to be performed with Input/Output tools you now know
Known Biases in Problem Solving and Reasoning

- 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

Help people problem solve
Movies about Cognition and mental models

- Best illusion ever [movie]
- Nearly any bloopers reel [movie]
Ch 7: Human-computer communication

- Fundamentals of language
- Grice’s maxims
- How users read
  - Fonts
  - How the eye moves, design
  - Paper vs. screen
  - Scanning
- Human information seeking behavior
  - Scent
  - Will seek for a little or a long time

Help people understand by using what we know about communication between people
Ch. 10: What is Error?

- Big accidents: motivation for study
- Little accidents: causes, types, you can help
- 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).
A 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
- Cascade of errors is required for a safety-critical system to fail
Causes of Error

- Single operator's noisy, imperfect human hardware
- Distractions
- State misidentifications
- Social status vs. task problems, pardon me sir, but is that not an iceberg?
- You should be able to list many more: perception, action, cognition, social, learning, etc.
- Experts catch them
- Experts know how to fix them
- Experts know how to adjust the system
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]
- Be able to explain them, causes, fixes

Help people avoid error, notice error, correct error
ACT-R

- Goal Buffer
- Declarative Buffer
- Production Rule System
- Perceptual Buffer
- Motor Buffer
- Simulated Eyes and Hands
- Image Processing Routines
- Motor Routines
- Computer Environment
Comments on Labs

- Support your users (readers), help them build their mental model of your work
- Explain why work is important, what you did (for replication and understanding), what you found, what it means, i.e.
  - Intro
  - Method
    - Subjects, materials, design and procedure
  - Results
  - Conclusions/implications
- Understand your recent results
Comments on Exam

- 20 questions like previous exams

- The exam will be in 208

EXAMPLE EXAM QUESTIONS ARE ON THE CLASS WEB SITE, IN BOOK, AND BOOK WEB SITE