Diagram

Description automatically generated

**Lesson 10**

In this lesson, we will look into two methods for task analysis:

1. Human information processor models - Especially GOMS Model, Input to user and output from user (Processor model)
2. Cognitive task analysis - A way to get inside users head (predictor model)

**GOMS Model**

A human information processor model; it builds off the processor model of the human's role in a system. There are four categories in the GOMS model:

1. Goals - users goals
2. Operators - user operations to carry out method
3. Methods - user can use to complete (Methods - Operator 1---n)
4. Selection rules - which to select methods

This model proposes that a human has a set of *goals* and *methods* they can choose from to accomplish those goals. Each method is comprised of a series of *operators* which help carry out that method. Lastly, they use some set of *selection rules* to help decide what method to choose from.

Ex - Transfer information to coworkers - Email, chat, In person, etc.

**Strengths And Weaknesses Of GOMS**

Weaknesses of GOMS model:

1. Does not address complexity - There are many methods and submethods. Standard GOMS rules this out.
2. Assumes user is an expert - GOMS doesnt account for novices and user errors. I dont know highway in USA.

Strengths of GOMS model:

1. Formalize user interaction into steps - Interaction steps to measure for efficiency. Helps to narrow down the time for each steps. Finding areas of improvement. Count time for each operator, easy to get keychain while holding something in hand.

**Types of GOMS**

KLM - GOMS -> Keystroke level model - here operator + execution time - efficiency determination - original work had 6 types of operators, wont work on modern ideas Card, Moran and Newell GOMS *CMN GOMS* - Hierarchical Goals and choose multiple goals - Very low level goals (moving text,delete phrases) - Model how long each individual GOMS to take - Find place which we can cut out N GOMSL - Natural language GOMS - Working memory if exploited can be identified - lends itself for human interpretation.

**5 Tips: Developing GOMS Models**

1. Focus on small goals
   * GOMS shud be small, abstract up from there.
   * Example - Navigating end of doc.
2. Nest goals, not operators
   * GOMS of Navigation
     + GOMS for changing lanes and plotting routes
     + Operators are smallest atoms of GOMS models. Dont breakdown further
3. Differentiate descriptive *What people do* and prescriptive *What they wanna do*
   * GOMS of former doesnt mean they will do later. They will not do that?
4. Assign costs to operators
   * Measurement of operators will take.
5. Use GOMS to trim waste
   * Use GOMS to cut cost by reducing operators.

**GOMS to Cognitive Task Analysis**

The GOMS model assumes the human is an input-output machine (processor model). However, human reasoning may be too nuanced and complex to be so simplified.

Cognitive task analysis is another way of examining tasks but it puts a much higher emphasis on things like memory, attention, and cognitive load (predictor model).

* Behaviorism vs Cognitivism
  + Observable of things
  + Get into mind.

**Cognitive Task Analysis**

Its collection of methods focus on what we cant see.

Cognitive task analysis are concerned with the underlying thought process associated with performing a task. Most methods follow a particular common sequence:

1. Collecting preliminary knowledge
   * No experts needed, but need some familiarity (observe ppl performing tasks)
2. Identify knowledge representations
   * What does user know what they need to complete a task. Ex: Ordering of tasks/ Memorization etc.
   * For navigation, monitoring and sequence of actions.
3. Apply focused knowledge elicitation methods
   * Identifyy task, knowledge by thinkout loud about it.
   * Get user to tell us what they have in mind.
   * What changed their approach, what did they do in prior and what they do after change.
4. Analyze and verify data acquired
   * Confirming if understanding is correct.
5. Format results for intend application
   * We take results and models user.

Result looks like a flow chart, with various tasks in each box.

**Hierarchical Task Analysis**

Tasks could be broken and small tasks could be reused.

This form of task analysis helps us understand what tools might already be available to accomplish certain portions of our task, or how we might design certain things to transfer between different tasks and different contexts.

Hierarchical task analysis process:

1. Abstracting out unnecessary details for a certain level of abstraction
2. Modularizing designs or principles so that they can be transferred between different tasks or different contexts
3. Organizing the cognitive task analysis in a way that makes it easier to understand and reason over

**Cognitive Task Analysis Strengths And Weaknesses**

Like the GOMS model, cognitive task analysis also have strengths and weaknesses.

Strengths:

1. Emphasizes mental processes
   * Unlike GOMS, emphasis on whats goes on users head
2. Formal enough to for interface design
   * Easy to communicate Weaknesses:
3. Time-intensive - They involve talking and systemtic analysis of data
4. May deemphasize context - Role of artifacts and details in world
5. Ill-suited for novices - Whos try to use an interface.

**Other task analysis**

**Human information**

* KLM - Keystroke level model
* TLM - Touch leve model
* MLP - Model human processor
* CPM-GOMS - Parallel tasks.
* NGOMSL - Natural language.

**Cognitive Models**

* CDM - Critical decision model - Focus on critical decision
* TKS - Task knowledge structures - Focus on user knownledge.
* CFM - Cognitive function model - Focus on complexity
* Appplied CTA
* Skilled CTA

**Important Videos**

2,5,7,8,10,11,13