

task analysis

focus on HTA

extract from chap 7 slides for
Human Computer Interaction
<http://www.hcibook.com/>

What is Task Analysis?

- Methods of analysing people's jobs:
 - what people do
 - what things they work with
 - what they must know

An Example

- in order to clean the house
 - get the vacuum cleaner out
 - fix the appropriate attachments
 - clean the rooms
 - when the dust bag gets full, empty it
 - put the vacuum cleaner and tools away
- must know about:
 - vacuum cleaners, their attachments, dust bags, cupboards, rooms etc.

Approaches to task analysis

- Task decomposition
 - splitting task into (ordered) subtasks
- Knowledge based techniques
 - what the user knows about the task and how it is organised
- Entity-relation based analysis
 - relationships between objects, actions and the people who perform them
- General method:
 - observe
 - collect unstructured lists of words and actions
 - organize using notation or diagrams

Differences from other techniques

Systems analysis vs. **Task analysis**
system design - focus - the user

Cognitive models vs. **Task analysis**
internal mental state - focus - external actions
practiced 'unit' task - focus - whole job

Task Decomposition

- Aims:
 - describe the actions people do
 - structure them within task subtask hierarchy
 - describe order of subtasks
- Focus on Hierarchical Task Analysis (HTA)
 - text and diagrams to show hierarchy
 - plans to describe order

Textual HTA description

Hierarchy description ...

- 0. in order to clean the house
 - 1. get the vacuum cleaner out
 - 2. get the appropriate attachment
 - 3. clean the rooms
 - 3.1. clean the hall
 - 3.2. clean the living rooms
 - 3.3. clean the bedrooms
 - 4. empty the dust bag
 - 5. put vacuum cleaner and attachments away

... and plans

- Plan 0: do 1 - 2 - 3 - 5 in that order. when the dust bag gets full do 4
- Plan 3: do any of 3.1, 3.2 or 3.3 in any order depending on which rooms need cleaning

N.B. only the plans denote order

Generating the hierarchy

- ① get list of tasks
- ② group tasks into higher level tasks
- ③ decompose lowest level tasks further

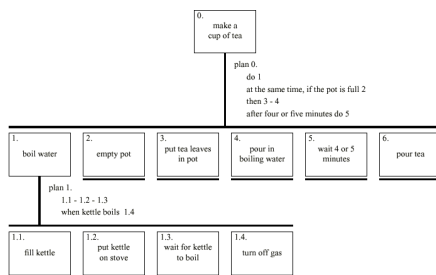
Stopping rules - How do we know when to stop?

Is "empty the dust bag" simple enough?

Purpose: expand only relevant tasks

Motor actions: lowest sensible level

Diagrammatic HTA



Refining the description

Given initial HTA (textual or diagram)
How to check/improve it?

Some heuristics:

paired actions

e.g., where is 'turn on gas'

restructure

e.g., generate task 'make pot'

balance

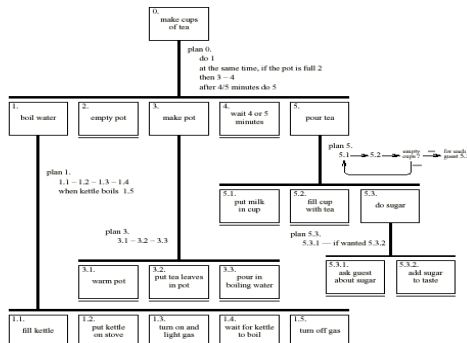
e.g., is 'pour tea' simpler than making pot?

generalise

e.g., make one cup or two

..... or more

Refined HTA for making tea



Types of plan

- fixed sequence - 1.1 then 1.2 then 1.3
- optional tasks - if the pot is full 2
- waiting for events - when kettle boils 1.4
- cycles - do 5.1 5.2 while there are still empty cups
- time-sharing - do 1; at the same time ...
- discretionary - do any of 3.1, 3.2 or 3.3 in any order
- mixtures - most plans involve several of the above

Sources of Information

Documentation

N.B. manuals say what is supposed to happen
but, good for key words and prompting interviews

Observation

formal/informal, laboratory/field (see Chapter 11)

Interviews

the expert: manager or worker? (ask both!)

Early analysis

Extraction from transcripts

list nouns (objects) and verbs (actions)
beware technical language and context:
'the rain poured' vs. 'I poured the tea'

Sorting and classifying

grouping or arranging words on cards
ranking objects/actions for task relevance (see Ch. 11)
use commercial outliner

Iterative process:

data sources ↔ analysis

But costly, so use cheap sources where available

Manuals and Documentation

Conceptual Manual

- from knowledge entity relations based analysis
- good for open ended tasks

Procedural 'How to do it' Manual

- from HTA description
- good for novices
- assumes all tasks known

To make cups of tea

boil water — see page 2
empty pot
make pot — see page 3
wait 4 or 5 minutes
pour tea — see page 4

— page 1 —

Make pot of tea

once water has boiled
warm pot
put tea leaves in pot
pour in boiling water

— page 3 —

Uses of Task Analysis II

Requirements capture and systems design

- lifts focus from system to use
- suggests candidates for automation
- uncovers user's conceptual model

Detailed interface design

- taxonomies suggest menu layout
- object/action lists suggest interface objects
- task frequency guides default choices
- existing task sequences guide dialogue design

NOTE. task analysis is never complete
rigid task based design ⇒ inflexible system