

HUMAN-COMPUTER INTERACTION THIRD EDITION
DIX FINLAY ABOUW BEALE

chapter 15

task models

extract for MSc/MRes AISD

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What is Task Analysis?

Methods to analyse people's jobs:

- what people do
- what things they work with
- what they must know

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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.

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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/object based analysis
 - relationships between objects, actions and the people who perform them
- lots of different notations/techniques

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general method

- observe
- collect unstructured lists of words and actions
- organize using notation or diagrams

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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

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Task Decomposition

Aims:
 describe the actions people do
 structure them within task subtask hierarchy
 describe order of subtasks

Variants:
 Hierarchical Task Analysis (HTA)
 most common
 CTT (CNUCE, Pisa)
 uses LOTOS temporal operators

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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

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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

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Tasks as explanation

- imagine asking the user the question: **what are you doing now?**
- for the same action the answer may be:
 - typing ctrl-B
 - making a word bold
 - emphasising a word
 - editing a document
 - writing a letter
 - preparing a legal case

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HTA as grammar

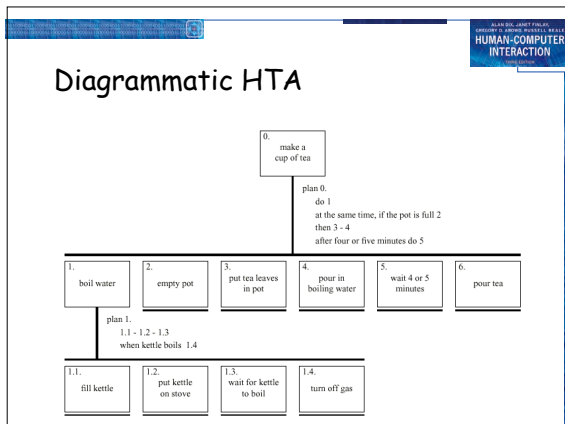
- can parse sentence into letters, nouns, noun phrase, etc.

The cat sat on the mat.

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parse scenario using HTA

0. in order to clean the house
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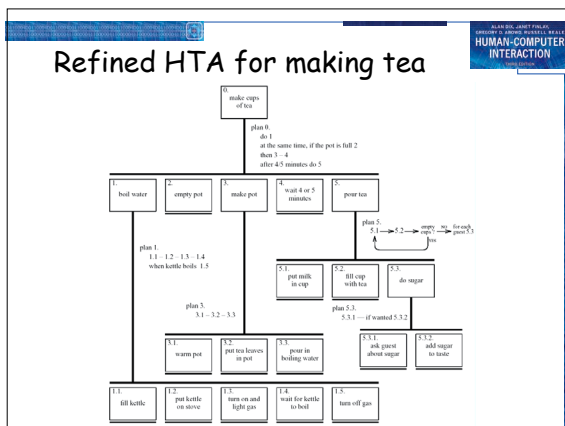


Refining the description

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 more



Types of plan

- fixed sequence - 1.1 then 1.2 then 1.3
- optional tasks - if the pot is full 2
- wait 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

waiting ...

- is waiting part of a plan? ... or a task?
- generally
 - task - if 'busy' wait
 - you are actively waiting
 - plan - if end of delay is the event
 - e.g. "when alarm rings", "when reply arrives"
- in this example ...
 - perhaps a little redundant ...
 - TA not an exact science

see chapter 19 for more on delays!