A Simpler Approach To Hierarchical Task Analysis For User Interface Design

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Introduction

Proposes A Redefinition of HTA charts.
Use of Symbols
An Empirical Experiment
Analysis
Further Redefinition
Motivations

- A tool for defining lower level tasks for interaction with users
- Documentation
- User Evaluation
Task Analysis

The study of steps required to be executed in terms of actions and/or cognitive processes to achieve a system’s goal.
There are seven types of commonly used plans:

- fixed sequence
- optional
- wait for events
- cycle
- time sharing
- discretionary
- mixtures
Newly defined method for fixed sequence and wait for event types of plan.
Newly defined method for optional plan depending on circumstances

**USE_keyboard Method**

**Move through Chapter1 using “page down” KEY**

**Move through Chapter1 using “arrow” KEY**

**KEY:**
- **O** - optional task
- **↓** - if

**IF paragraph1 is far to reached**

**IF paragraph1 is near to current position**
The newly defined method of optional plan depending on choice

Find Paragraph 1

USE_keyboard Method  O
USE_mouse Method  O

KEY:
0 - optional task
The newly defined method of wait event plan

Edit Chapter 1

Retype Paragraph 1

Check Paragraph 1

W10 min

KEY:
W-x- Wait for x unit time
The newly defined method of a cycle plan

- Move through Chapter 1 using "page down" KEY
- Press "page down" KEY
- UNTIL paragraph 1 is reached

KEY:
* - optional task
- UNTIL
The newly defined way of Time Sharing tasks.

Press mouse button at start of text

Hold mouse & button

Drag mouse & until end of paragraph 1

KEY:
& - tasks done at the same time or can be intermingled
The newly defined method of discretionary tasks

Edit Manuscript

Edit Chapter1 #

Edit Chapter2 #

KEY:
# - task done in any order
The way identical operations are represented

- Edit Manuscript
  - Edit Chapter 1
    - Retype Paragraph 1 (W10 min)
      - Remove Paragraph 1
        - Find Paragraph 1
          - USE_keyboard Method
        - B
    - Check Paragraph 1
    - Type new Paragraph 1
      - A
      - C
  - Edit Chapter 2
    - Remove Paragraph 3
    - Copy Paragraph 2 Of Chapter 4
      - B
      - C
  - Press “delete” KEY
    - KEY: identical operation to X

- USE_mouse Method
- USE_keyboard Method
The Empirical Experiment

The aim of this experiment is to find out whether there is an improvement on the usability of HTA_s (the newly defined HTA chart) compared to HTA_t (the predefined HTA chart).
The subjects used for experiment

- Age ranges from 19-40 years old
- 10% of subjects were lecturers in the Faculty of Science Computer and Information Technology
- 25% of subjects were students from computer science background in the first year
- 30% of subjects were students from computer science and engineering background, 2nd year and above
- 30% of subjects were students from non computer background courses
- 5% of subjects were engineers from PETRONAS CARIGALI SHD. BHD.
There were two types of experiment done:

- Experiment 1 (E1) was done with a chart that covers almost 100% of an A4 paper.
- Experiment 2 (E2) was done with a chart that covers almost 70% of an A4 paper.
HTAₐ that covers almost 100% of an A4 paper (HTAᵦᵩₐ)

Plan 3.1.1: do 3.1.1.1, 3.1.1.2 in that order

Plan 1: do 1.1, 1.1.2- in that order

Plan 0: do 1, 2, 3 – in any order

Focus on the top part of square

Focus on the bottom part of square

Focus on the middle part of square

Draw shapes in the square given

Draw shapes and number them from 0

Draw shapes and number them from the last number in the given square

Draw shapes and number them from 100

Plan 1.1: do 1.1.1, 1.1.2- in that order

Plan 2: do 2.1

Plan 3: do 3.1

Draw squares starting from the most left

Draw triangles

Number them according to the order the shapes were drawn

Plan 1.1.1: do 1.1.1.1 until 3 of them are drawn, do 1.1.1.2 until no more room

Plan 2.1: do 2.1.1, 2.1.2- in that order

Plan 2.1.1: do 2.1.1.1- if wanted, 2.1.1.2- if no square in the middle, 2.1.1.3- if wanted

Plan 2.1.2: do 2.1.1.1- if wanted, 2.1.1.2- if no square in the middle, 2.1.1.3- if wanted

Plan 3.1.1: do 3.1.1.1, 3.1.1.2 in that order

Draw shapes

Number them according to the order the shapes were drawn

Plan 1.1.1: do 1.1.1.1 until 3 of them are drawn, do 1.1.1.2 until no more room

Draw squares

Number them from the last number in the given square

Plan 2.1.1: do 2.1.1.1- if wanted, 2.1.1.2- if no square in the middle, 2.1.1.3- if wanted

Draw circles

Number them according to the order the shapes were drawn

Plan 3.1.1: do 3.1.1.1, 3.1.1.2 in that order

Draw 2 small circles anywhere

Draw a big circle in a free space
Results of Experiment

<table>
<thead>
<tr>
<th></th>
<th>HTA_{bt}(E1)</th>
<th>HTA_{bs}(E1)</th>
<th>HTA_{st}(E2)</th>
<th>HTA_{ss}(E2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean score, $s$</td>
<td>5.1</td>
<td>5.9</td>
<td>5.5</td>
<td>5.3</td>
</tr>
<tr>
<td>mean time, $t_{min}$</td>
<td>6.5</td>
<td>4.7</td>
<td>6.9</td>
<td>4.9</td>
</tr>
<tr>
<td>percentage of help, $h%$</td>
<td>95</td>
<td>27</td>
<td>71</td>
<td>47</td>
</tr>
</tbody>
</table>

Table 1: The mean score, mean time and the percentage of help needed to do each of the 4 types of chart
Changes made are:

- the circumstance statements for the optional task will be put just below the description of the optional task in the same box.
- the conditional statements to repeat an iterative task will be put just below the description of the iterative task in the same box.
- the numbering system from the predefined HTA chart (HTA₁) will be included in the newly defined HTA chart (HTAₙ). Therefore the tag symbol used to identify a particular task can be eliminated, instead the number of that particular task was used.
Q&A

Discussion