Teaching Computer Operation to People with Higher Brain Dysfunction: A Case Study

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Background

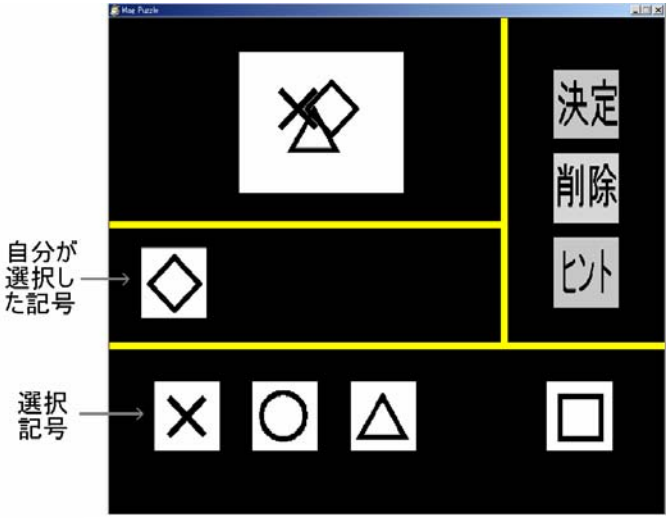
- People suffering from higher brain dysfunction is increasing in number for these days in Japan owing to the development of the emergency medical care system.
- They have great difficulty for taking part in the society or reinstating them in their previous position due to their complex symptoms.
- Computer operation ability may come to an important way for them to join the society and communicate with other people.
- We have trained a person with both unilateral neglect and attention disorder for more than a year and obtained some knowledge on how to deal with these disorder in case of using computer.

Method

- A subject of our training is a male in his fifties.
- He has unilateral neglect and attention disorder due to subarachnoid hemorrhage as well as left half paralysis.
- He operate the computer only by his right hand.
- He was a quite beginner of the computer when we had started training.
- We have carried out training on mouse operation including clicking and dragging, text entry and folder operation.
- We also examined his visual perceptual ability such as perception of figures or position in the image appeared in computer display.
- Our method is as follows:
  - experience some operation,
  - find difficulty in the operation
  - check his ability to percept or understand the operation
  - start with more basic level training required to execute the operation that he could not carried out before.
- In some cases we prepared certain stimulation in the left side of his sight to attract his attention to left half of the computer screen.

Ability check phase

Tool like the trail-making test



Check figure shape recognition

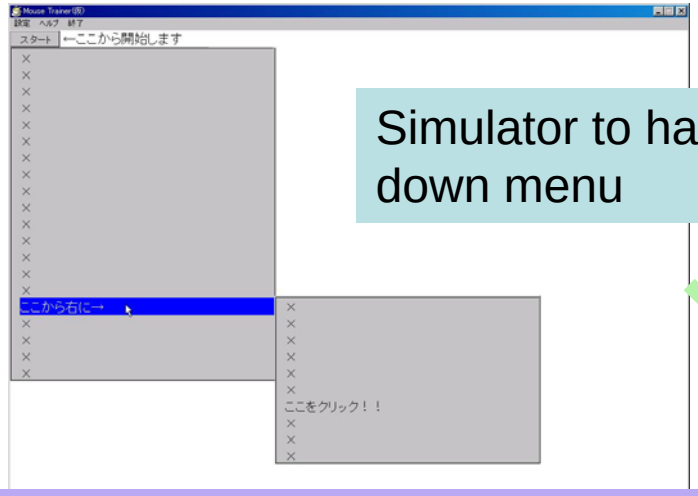
Check spatial perception

(Which is near to user?)

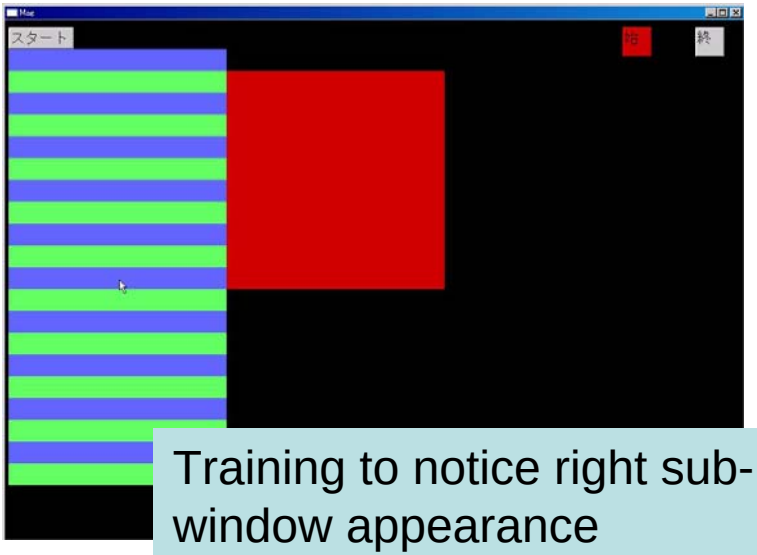
Check the sight

(Unilateral neglect and attention)

Mouse operation training



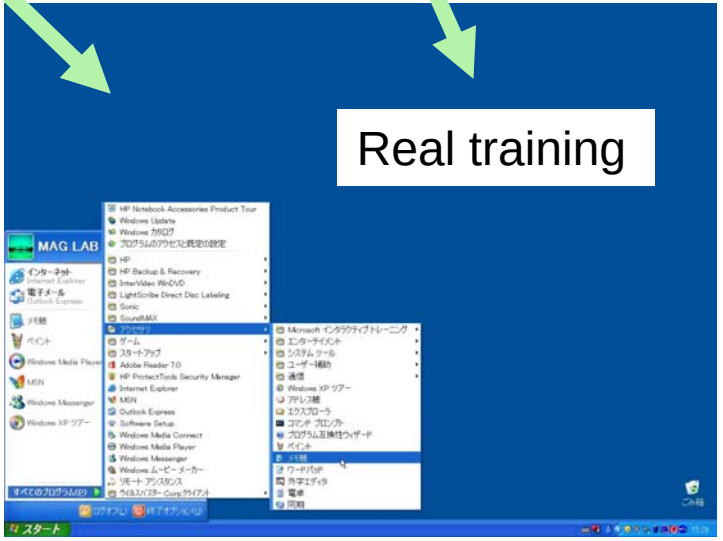
Simulator to handle pull-down menu



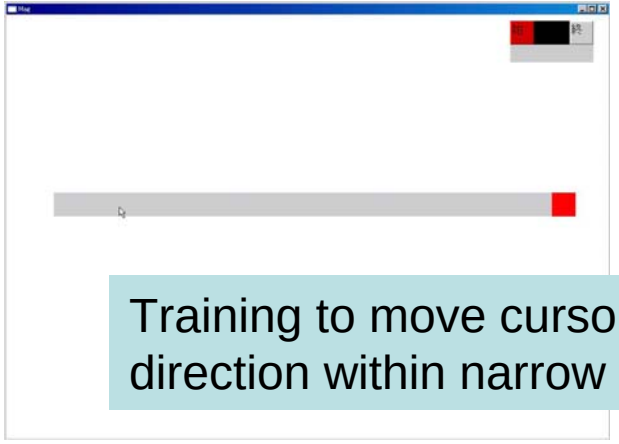
Training to notice right sub-window appearance

Note: Difficult to move cursor to horizontal direction.

Appearance of submenu could not be recognized during mouse operation



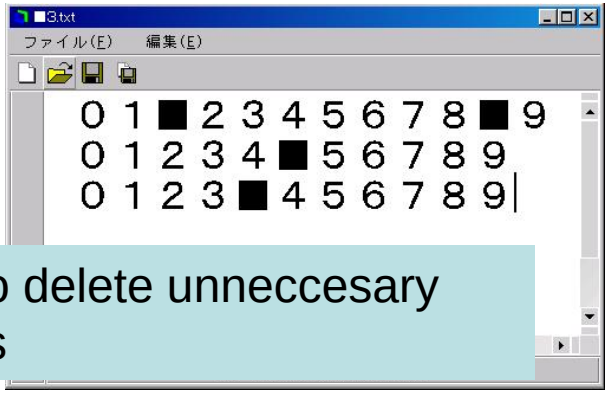
Real training



Training to move cursor to the right direction within narrow path

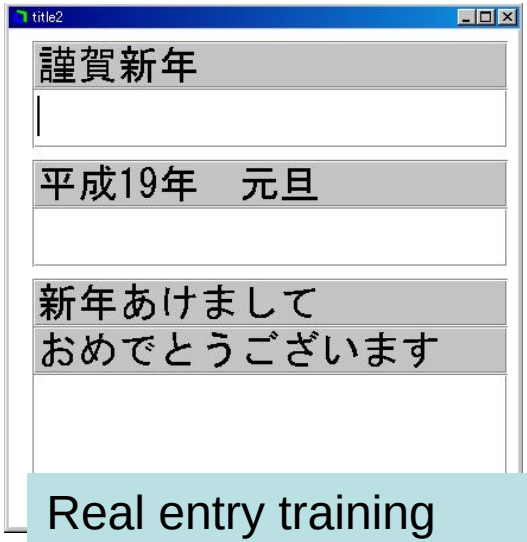
Text entry training

Use software keyboard specially designed for this training



Training to delete unneccesary characters

Training to recognize special characters such as “newline” and “space” characters



Real entry training

Note: Correcting text was more difficult than entry

Results & Discussion

- Neglect and attention test
  - Memory and recognition trouble is not seen.
  - Attention to the change in window is difficult and the figure and background are difficult to distinguish.
- Mouse operation training
  - Trackball or joystick type pointing device is recommended.
  - When operating pull-down menu, he cannot put attention to the right side submenu due to attention disorder.
  - Moving mouse to horizontal direction precisely is difficult.
- Text entry training
  - We employed a software keyboard on the screen.
  - Key layout is based on the systematic table of the Japanese syllabary (“50 on”)
  - The unilateral neglect strongly affects the recognition of characters in the line.
  - The subjects could not compare the sample text and the text which he had entered.
  - Error correction is more difficult than text entry.

Conclusions

- Through above trainings we could find out following problems:
  - Attention disorder caused cursor missing in the noisy background or overlapped multiple windows.
  - Attention disorder made recognition of appearing and disappearing window difficult.
- One more important point is that the repetitive training could not improve the ability so much.
- Therefore, for the beginners having higher brain dysfunction such as unilateral neglect or attention disorder, a training tool specially designed for those people is strongly needed to learn the computer operation.