



Simple Mark Hierarchical Marking Menus

By Svetlana Slavova

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Outline

- n Introduction to menus
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- n My design of simple mark hierarchical marking menus
- n Evaluation
- n Results
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- n Conclusions

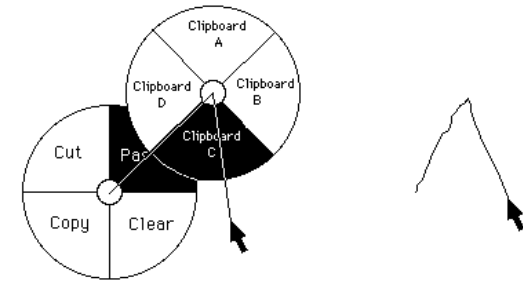
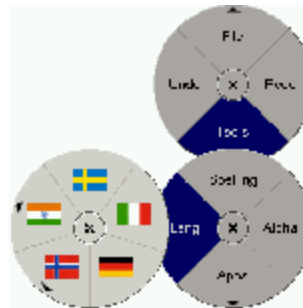


Introduction to menus

- n Menus are part of the user interface of every software system;
- n Menus are applied in various devices, such as personal computers, laptops, PDAs, BlackBerries, and cell phones;
- n The difference and the limitations of the input and the output of the ubiquitous computing devices require appropriate menus to be applied;
- n There are different styles of menus – linear, pie, and marking menus.

Problem definition

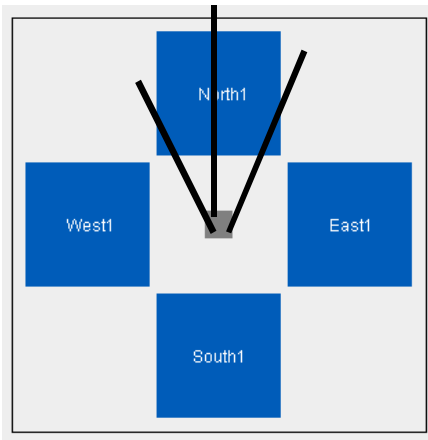
- n Linear and pie menus occupy space
- n Hierarchical marking menus require compound zigzag actions to select an item



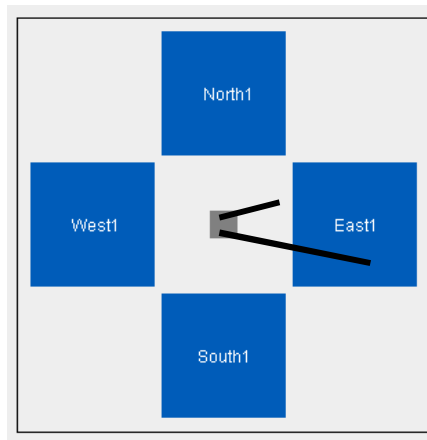
- n Is it possible to create a simple mark hierarchical marking menu?
- n If yes, what actions should it provide?

My design

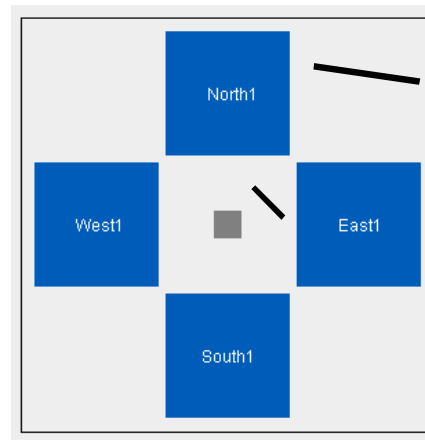
- n 2 simple mark hierarchical marking menus:
 - n 1st design: Actions 1, 2, and 3
 - n 2nd design: Actions 1, 2, (3), and 4



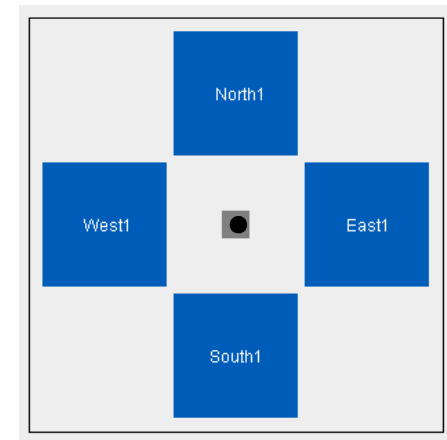
1. draw a mark



2. cancel the current mark



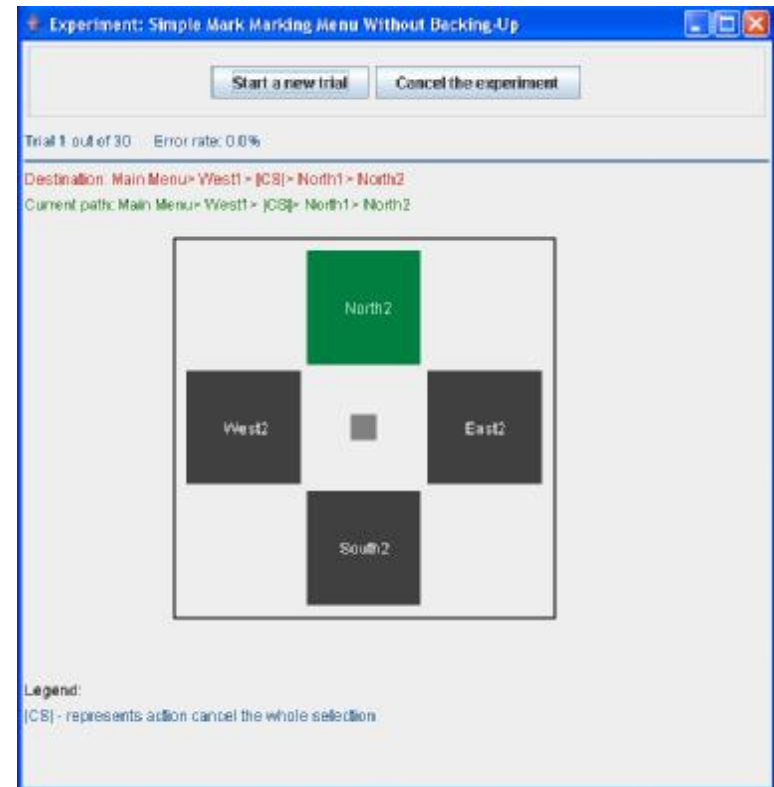
3. cancel the whole selection



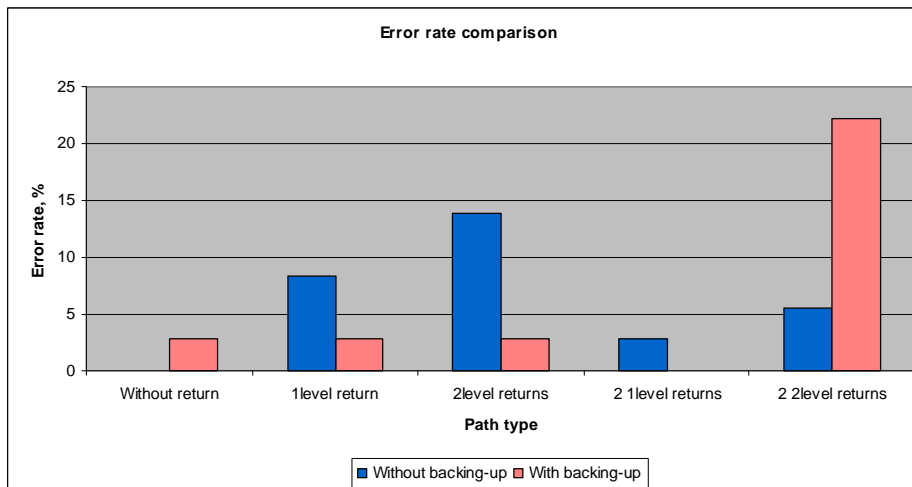
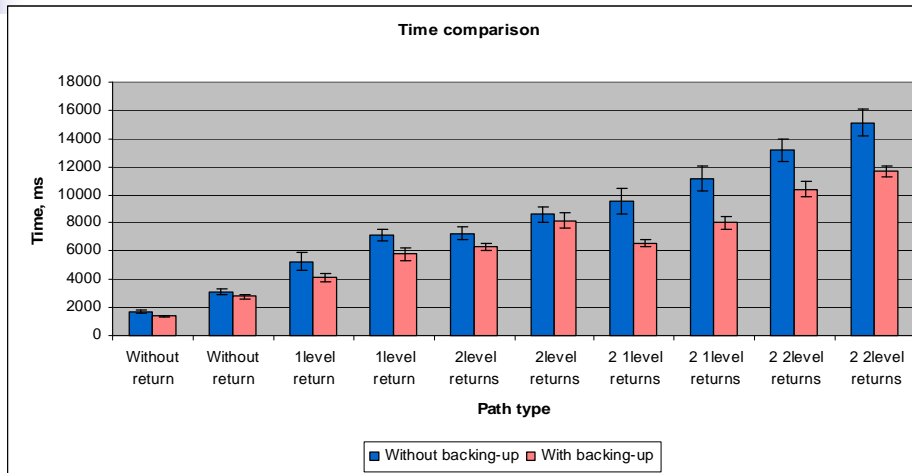
4. backing-up

Evaluation

- n Independent variables:
 - n 2 menu design experiments – with & without backing-up, 30 trials per experiment;
 - n 5 different types of paths, 2 paths per path type;
 - n 6 participants.
- n Dependent variables:
 - n Error rate;
 - n Time for item selection;
 - n Number of simple marks.

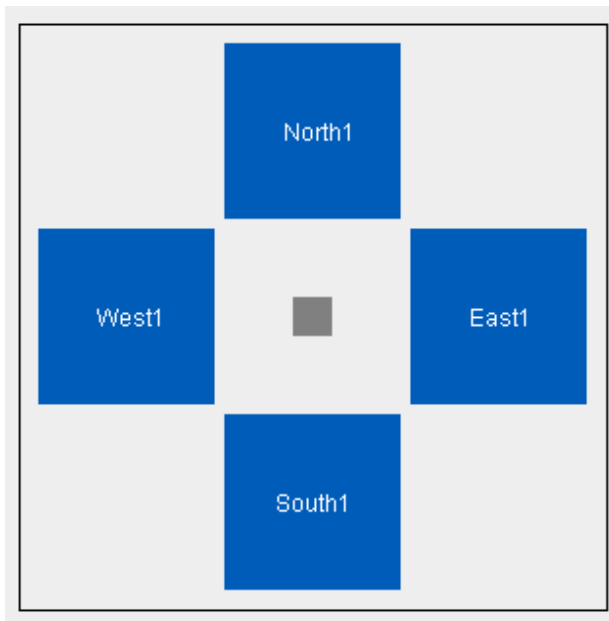


Results



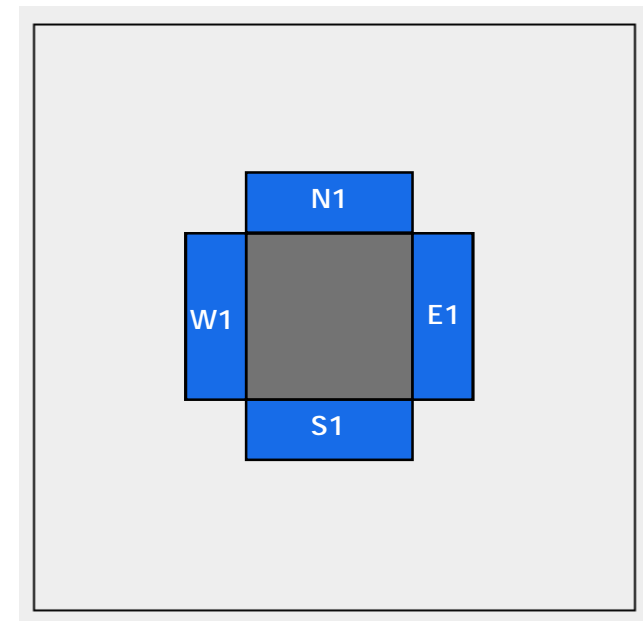
- n The design with backing-up is faster, although it requires more marks;
- n The design with backing-up has a stable error rate for real-world tasks.

Design implications



Current design

- Bigger start position
- Smaller items



Future design



Conclusions

- n It is possible to create a simple mark hierarchical marking menu, which consist of a set of marks that has to be drawn, in order to select an item;
- n The independence of the simple marks allows the construction of overlapping sub-menus;
- n Every set of marks is uniquely defined by the number of independent simple marks in it, as well as by their direction;
- n Simple menus that provide backing-up are faster and have a stable error rate, although they require more marks to be drawn;
- n Adding sounds after every action slows down the selection.



Thank you & Questions

