

Using fisheye for navigation on small displays

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ABSTRACT

In this paper we present a solution to the problem of visualising large amount of hierarchical information structures on small computer screens. Our solution has been implemented as a prototype for mobile use on a hand-held computer using Microsoft Pocket PC with a screen size of 240x320 pixels. The prototype uses the same information as service engineers use on stationary computers. The visualisation technique we used for displaying information is based on fisheye technique, which we have found functional on small displays. The prototype is domain independent; the information is easily interchangeable. A consequence of the result presented here is that the possibility of using hand-held computers in different types of contexts increases.

Keywords

Handheld computers, PDA, information visualisation, Fisheye, Focus+context

1. INTRODUCTION

Until recently, hand-held computers have primarily worked as a replacement for the daily planner. This use-context is now widening, and new applications are being developed. The small size of the hand-held computers gives not only possibilities, but also raises new issues and problems. For example, how can we visualise large amount of information on small screens, and still make the user aware of the information context?

Information visualisation is used for displaying information in an understandable way to the user. We have mainly used the technique Fisheye as described by Furnas (1981), since this technique focuses on visualising large hierarchic information structures. In our case, complex techniques like Graphical Fisheye View (Sarkar and Brown, 1992) and Hyperbolic (Lamping et al, 1995), are not suitable due to the small display. Instead we have focused on filtering the information and still make the user aware of the context.

2. THE PROTOTYPE

Our prototype, POCKETVIEWER (PV), is a spare part navigator for service engineers. The information in the application consists of detailed service and maintenance information about forestry machines. The use-scenario for the prototype is a service engineer using the hand-held computer in the field while repairing a forestry machine. He navigates to the broken part, and orders it from a central shipping unit. However, the information in the PV is not restricted to technical information. We have successfully replaced the information about forestry machines with information about groceries.

2.1 Type of information

The information in the application is constructed from databases and is based on images and XML-files. These files are generated outside our application. A similar system for laptop computers uses the same files.

2.2 Hardware platform

We used Casio Cassiopeia E-115 powered by Microsoft Pocket PC. The choice of operating system allows us to use the information files from the databases without converting them to other platforms, such as PalmPilot or Psion.

2.3 Implementation of visualisation

The large hierarchic information structure was implemented as menu using the fisheye technique (see Figure 1). A menu item can be selected by tapping on it with a pen. When selected, the other entries at the same level are hidden, and the menu shows the items in the subordinate level. All entries that have a ">" following the item name are selectable at any time. In this way the information structure is visualised and all levels are available for navigation.



Figure 1. Implementation of Fisheye-technique

2.4 Problematic issues

Displaying images is problematic. Figure 2 shows the selected item to repair; an image and a list with corresponding numbers of wanted spare parts. In original size, the image is a lot larger than the available screen space. This leads to an intensive scrolling in order to view all parts of the image. PV has a zoom function (the +/- 50% buttons), but the quality and resolution of the hand-held computers' screen makes it almost impossible to use the zoom. When using the zoom the image gets too small and distorted.

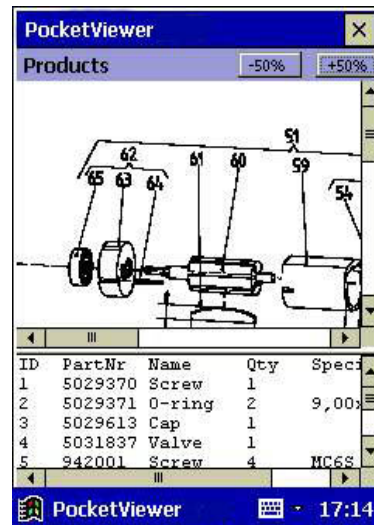


Figure 2. Showing selected item

3. CONCLUSION

When working in the area of applications for hand-held computers, we have noticed a lack of good design examples of visualisation of large information structures. In this work we have shown a practical example of a Fish-eye technique for this purpose. We find the technique functional for visualising hierarchical structures on hand-held computers with small screens. Our prototype is also domain-independent; the information structure is easily interchangeable to another.

4. ACKNOWLEDGEMENT

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5. REFERENCES

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