Components of Interactive Applications

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INTRODUCTION

It is felt that the way in which interactive applications are currently being written leads to a lot of duplication of effort: everybody writes a screen handler, an integer validation routine, a move system, etc. To avoid this, we want to break applications down into components that can be reused later. Two applications with a similar user interface (Ui/f) should be able to use the same Ui/f component. One application with two different Ui/f's should have only one application component. All Ui/f components should be built on top of the same display component.

Example: i) An airline reservation system and an electronic mail system could both have a similar "forms" Ui/f. ii) Options for a command could be specified via typed keywords or via menu choices. iii) A chess program could have a graphical Ui/f for use on a personal computer (PC), and a command line Ui/f for use via a terminal and telephone line.

A deeper analysis of the third example indicates how we may partition applications. The second example has often been used in the past as a model. However, its two Ui/f's are too similar. The results suggested by its analysis are not sufficiently general.

ANALYSIS OF A CHESS PROGRAM

Consider an imaginary program, that is designed to teach you how to play chess. Two different Ui/f's are described for it.

1. The personal computer Ui/f. (see fig. 1)

A picture of a chessboard is shown on the screen, with all the pieces drawn in their current positions. Whenever the cursor touches one of your pieces, all positions to which that piece can legally move are highlighted on the screen. In addition, in each position a number is displayed that indicates the strategic importance (successfactor) of a move to that position. All these effects are considered as immediate feedback. Once you have decided which piece to move, you position the cursor over it, and you depress a mouse button. The piece becomes highlighted as the starting point of the move. As long as the mouse button is down, the cursor is assumed to indicate the destination of your move. As such, a position which is legal for the starting piece and which is nearest to the cursor becomes highlighted. When the mouse button is released, the move is visually recorded and, after a certain time, the program produces a countermove.
Fig. 1. Example of the PC chess user interface

8 bQ bR bR
7 bP bP bP bP bP
6 wP bK bP
5
4 bB wP wR
3
2 wP wP wK wP wP wP
1 wR wN wQ

>TRY FROM e4 TO e5
Successfactor=1.
>MOVE FROM e4 TO h4
Move registered. Counter move is a7 to a6.

Fig. 2. Example of the teletype chess user interface

2. The teletype Ui/f. (see fig. 2)

A symbolic representation of a chessboard is printed out, line by line, indicating the position of all pieces. Using some coordinate system, you can now enter one of the following commands: