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User Interface ==>  
All Windows ==>  
SunView1 ==>

h19 terminal emulator

h19 terminal emulator

don/n 1]

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[xasanda:/bensun/don/n 1]  
psh  
executive  
Welcome to NeWS Version 1.1  
dbgetart  
Debugger installed.  
█
```

## Pie Menus

Menus on computer displays are usually a linear row or column of choices. We propose an alternative to these rectilinear menus, called the Pie menu. The choices of a Pie Menu are positioned in a circle around the cursor. The direction in which the cursor is moved makes the menu selection, and the length of motion is available as a second input. We discuss the implementation, evaluation, and application of pie menus. We have implemented them in Sun's NeWS window system, where they are completely compatible with the standard menu package. This is a robust implementation in everyday use.

Figure 1: A Computer with a Mouse

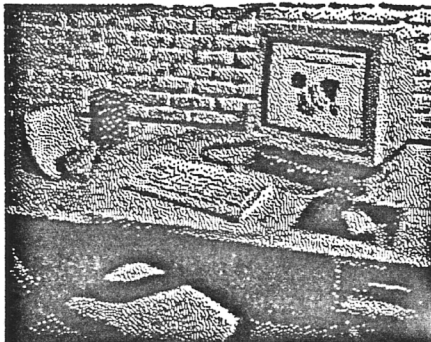
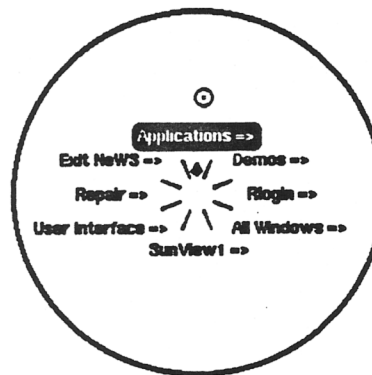


Figure 2: A Pie Menu



We have also evaluated pie menus in a controlled experiment comparing rectilinear menus with pies on a series of tasks chosen to show both rectilinear and pies to good advantage. Our computer-naïve subjects, regardless of task, made selections faster and made fewer mistakes using pie menus. Finally, we offer a bit of speculation on the theoretical advantages of pie menus in new applications (or re-organized old applications). Three such advantages are: (1) the return of two kinds of information from every pie selection (angle and radius), and (2) the kinesthetics of nested menu selections and large angular arm motions, (3) the existence of natural opposites (left/right, up/down) in a pie menu.

## Pie Menus

Menus on computer displays are usually a linear row or column of choices. We propose an alternative to these rectilinear menus, called the Pie menu. The choices of a Pie Menu are positioned in a circle around the cursor. The direction in which the cursor is moved makes the menu selection, and the length of motion is available as a second input. We discuss the implementation, evaluation, and application of pie menus. We have implemented them in Sun's NeWS window system, where they are completely compatible with the standard menu package. This is a robust implementation in everyday use.

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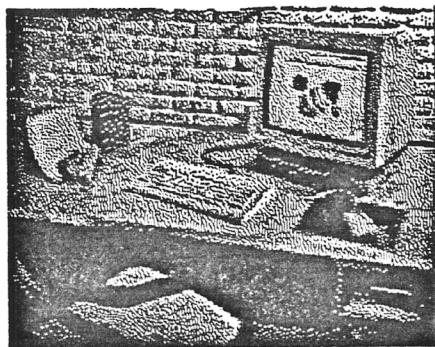
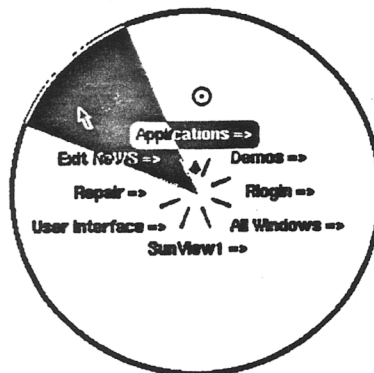


Figure 2: A Pie Menu



We have also evaluated pie menus in a controlled experiment comparing rectilinear menus with pies on a series of tasks chosen to show both rectilinear and pies to good advantage. Our computer-naïve subjects, regardless of task, made selections faster and made fewer mistakes using pie menus. Finally, we offer a bit of speculation on the theoretical advantages of pie menus in new applications (or re-organized old applications). Three such advantages are: (1) the return of two kinds of information from every pie selection (angle and radius), and (2) the kinesthetics of nested menu selections and large angular arm motions, (3) the existence of natural opposites (left/right, up/down) in a pie menu.

## Pie Menus

Menus on computer displays are usually a linear row or column of choices. A rectilinear menu, called the Pie menu. The choices of a Pie Menu are positioned around a central point. The direction in which the cursor is moved makes the menu selection, and the distance from the center as a second input. We discuss the implementation, evaluation, and application of pie menus implemented them in Sun's NEWS window system, where they are completely integrated into the menu package. This is a robust implementation in everyday use.

Figure 1: A Computer with a Mouse

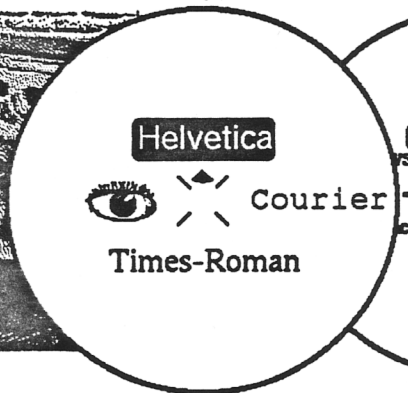
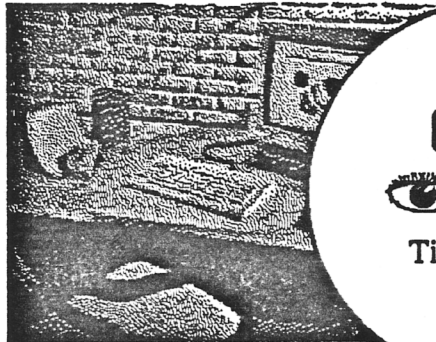


Figure 2

(448, 614)



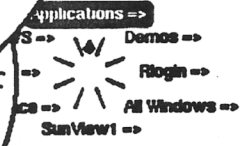
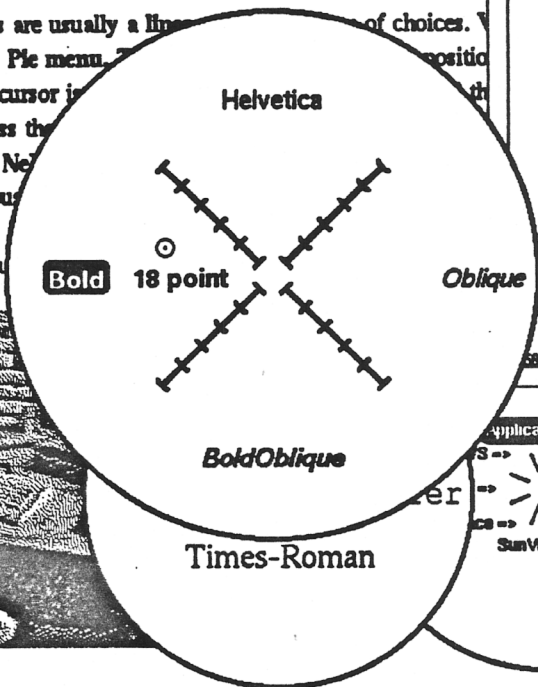
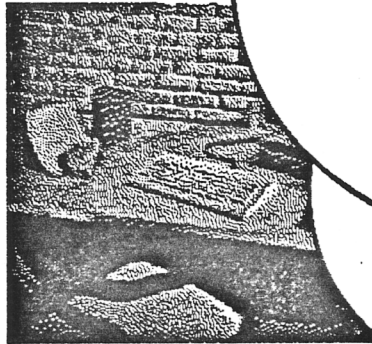
We have also evaluated pie menus in a controlled experiment comparing rectilinear menus with pies on a series of tasks chosen to show both rectilinear and pies to good advantage. Our computer-naïve subjects, regardless of task, made selections faster and made fewer mistakes using pie menus. Finally, we offer a bit of speculation on the theoretical advantages of pie menus in new applications (or re-organized old applications). Three such advantages are: (1) the return of two kinds of information from every pie selection (angle and radius), and (2) the kinesthetics of nested menu selections and large angular arm motions, (3) the existence of natural opposites (left/right, up/down) in a pie menu.



## Pie Menus

Menus on computer displays are usually a linear list of choices. Variations on this include pop-up menus, which are positioned near the cursor. The direction in which the cursor is moved is used as a second input. We discuss the implementation of pie menus in Sun's NeXT menu package. This is a robust

Figure 1: A Computer



We have also evaluated pie menus in a controlled experiment comparing rectilinear menus with pies on a series of tasks chosen to show both rectilinear and pies to good advantage. Our computer-naïve subjects, regardless of task, made selections faster and made fewer mistakes using pie menus. Finally, we offer a bit of speculation on the theoretical advantages of pie menus in new applications (or re-organized old applications). Three such advantages are: (1) the return of two kinds of information from every pie selection (angle and radius), and (2) the kinesthetics of nested menu selections and large angular arm motions, (3) the existence of natural opposites (left/right, up/down) in a pie menu.

## Pie Menus

Menus on computer displays are usually a line of choices. We propose an alternative to the menu, called the **Pie menu**. The choices are positioned in a circle around the cursor. The length of motion to select a menu item is a second implementation of the application. We have implemented a window system which is completely standard and is a robust implementation of day use.

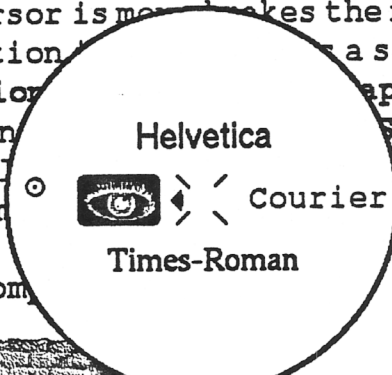
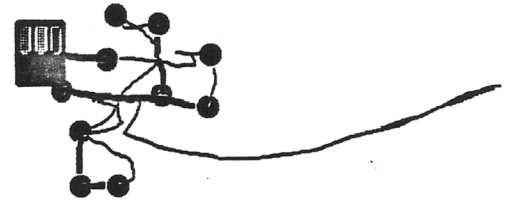
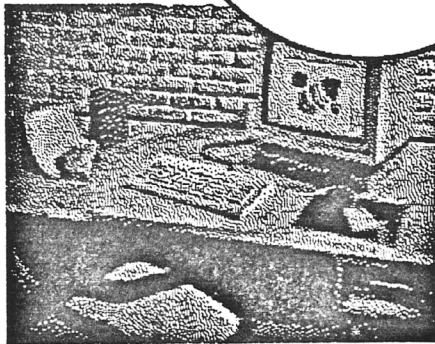
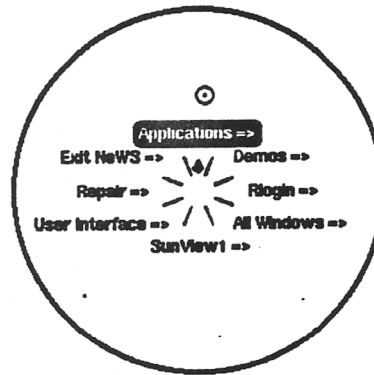


Figure 1: A Com



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Figure 2: A Pie Menu

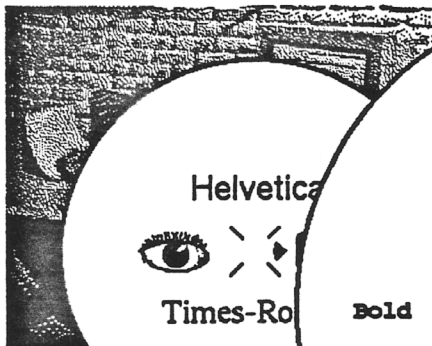


We have also evaluated pie menus in a controlled experiment

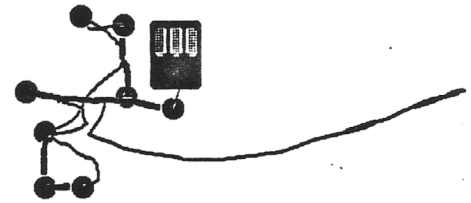
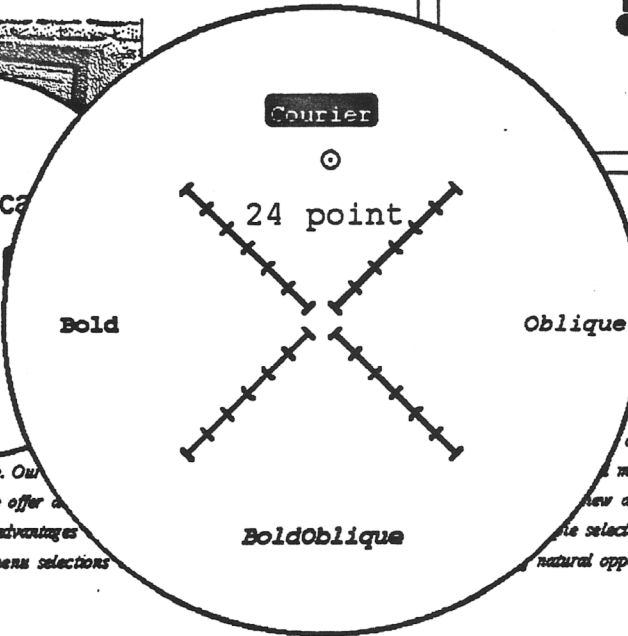
## Pie Menus

Menus on computer displays are usually a linear row or column of choices. We propose an alternative: the *Pie menu*. The choices of a *Pie Menu* are positioned in a circle around the cursor. The direction of the menu selection, and the length of motion is available as a second input. We discuss the benefits of pie menus. We have implemented them in Sun's NeWS window system, where they are commonplace. This is a robust implementation in everyday use.

Figure 1: A Computer with a Mouse



We have also evaluated pie menus in both rectangular and pie to good advantage. Our users made fewer mistakes using pie menus. Finally, we offer a new application (or re-organized old applications). Three such advantages are: (1) the kinesthetics of nested menu selections (left/right, up/down) in a pie menu.



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made  
new applications (or  
the selection (angle and  
natural opposites

PullDown

PullRound

Jabberwocky

'Twas brillig and the slithy toves  
Did gyre and gymble in the wabe.  
All mimsy were the borogroves  
And the mome raths outgrabe.

"Beware the Jabberwock, my son:  
The jaws that bite, the claws that catch  
Beware the Jubjub bird, and shun  
The frumious Bandersnatch."

He took his vorpal sword in hand  
Long time the manxome foe he sought  
So rested he by the Tumtum tree  
And stood a while in thought.

And as in uffish thought he stood  
The Jabberwock with eyes of flame  
Came whiffing through the tulgey wood  
And burbled as it came.

One-two! One-two! and through and through  
The vorpal blade went snicker-snack!  
He left it dead, and with its head  
He went galumphing back.

"And hast thou slain the Jabberwock?  
Come to my arms, my beamish boy!  
Oh frabjous day - calloo, callay!"  
He chortled in his joy.

'Twas brillig and the slithy toves  
Did gyre and gymble in the wabe.  
All mimsy were the borogroves  
And the mome raths outgrabe.

Helvetica



Courier

Times-Roman

Bold

24 point

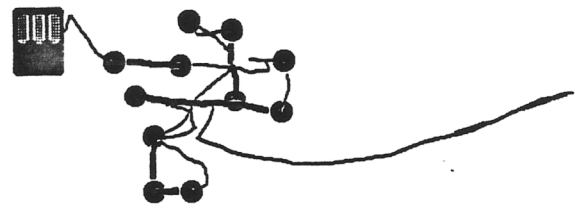
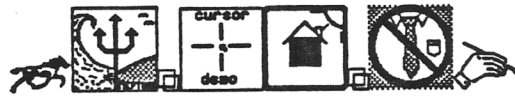
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overview



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