Design and Implementation of a Curved Multi-Touch Desktop

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Motivation

- used to work on vertical screens
- some tasks better done on horizontal surfaces
- connection of both might enhance the users' work-flow
CURVE - Motivation

- Motivation
- curved interactive display with multi-modal input
- combining horizontal and vertical interactive surfaces
- application area: everyday (office) work
CURVE - Related Work

i-m-Tube

Benko et al., 2008

Lin et al., 2009

Sphere
Starfire Interaction Video

http://www.asktog.com/starfire/index.html
Weiss et al., 2009

BendDesk
First Drawing
Expert Discussion:

- too high
- no inclination
- general challenge of vertical (touch) display
Integration of Ergonomics Standards

- width of 120 cm
- depth of 45 to 50 cm
- table height of 72 cm

Open Attributes:

- actual display height
- curve radius
- backward inclination of vertical display part
Experimentation:

- mainly qualitative user study
- nine participants
- participants have to draw different paths on the paper screens
- short questionnaires after each task
Average number of ranking points

ID of prototypes

Height (cm)

Inclination (°)

Curve Radius (cm)
→ Final panel dimensions:

- Panel thickness: 12 mm
- ~ 44 cm
- 38 cm
- 35 cm
- 10 cm
- 15°
- 75°
setup with two mirrors
setup with 4 mirrors
setup with 4-5 mirrors
setup with 3 mirrors
final mirror setup
construction of the casing by the carpentry of the LMU
Input:

- multi-modal in the long term
- as a start: keyboard, mouse, multi-touch using FTIR
- four *Point Grey Firefly MV* cameras (640 x 480 px at 63 fps)
- IR LED strips glued to the edges of the acrylic
image correction results
Output:

- Images need to be pre-warped and scaled to get an undistorted view in the curve.
- As a start: manual output calibration using distortion maps.
- Map creation with a small Java tool.
- Actual image processing using shaders with a Compiz\(^1\) plugin (fallback solution: distortion of a textured grid on CPU).

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1. Compiz is a 3D compositing window manager; for further information, see http://www.compiz.org/
- development of Curve still in progress
- output calibration should be refined
- direct-touch input does not work yet
Thank you

References


http://mtg.upf.edu/reactable/

http://www.microsoft.com/surface/Pages/Product/WhatIs.aspx
