Perspective Aware Projected User Interfaces

Lilian de Greef
Current Pack Stations

- Instructions off to side
Concept

- Project directly onto the table
- RGB-D camera
  - Detect errors
  - Correct projection
Future Pack Stations?

- Project directly onto the table
- RGB-D camera
  - Detect errors
  - Correct projection
Future Pack Stations?

- Project directly onto the table
- RGB-D camera
  - Detect errors
  - Correct projection

- Track eyes / head?
Related Work

Perspective-corrected 2D displays improve readability [Nacenta et al., UIST 2007]
3D Illusions

MAKE POVERTY HISTORY

EDINBURGH

JULIAN
Perspective-Enabled UI Tools

- Arrows pointing in 3D space
- Displays based on viewing angles
- Perspective-corrected text
- “Popped up” buttons, etc.
- The “right” combinations
The Box Search
Vision: Arrows in 3D Space

Get Box A3
Boxes at Different Heights
First Prototype

- Gaze & head tracking w/ Tobii
First Prototype

- Gaze & head tracking w/ Tobii
- Real-time POV on 3D model
- Perspective correction
First Prototype

- Gaze & head tracking w/ Tobii
- Real-time POV on 3D model
- Perspective correction
- Simulated “pack station”
Perspective Aware Arrows and Text
Challenges with Tobii

Works for traditional monitors, but not pack stations

Eyes must be visible
- within view
- open
- not occluded
Second Prototype

Head-track with RGB-Depth camera
Casual Usage
Test on Real Pack Station
Future Work

- Evaluate Efficacy: rigorous user studies
  - Speed
  - Ease of use
- Develop & evaluate other perspective-aware UI
Contributions

- Built perspective-aware system
  - On a desktop simulation (proof-of-concept)
  - At a real fulfillment center
- Evaluation of Tobii EyeTracker for pack stations
- Concepts for
  - Perspective-aware UI elements other than arrows
  - Visual attributes (parallax, shadow, texture, etc.)
Questions?
Lilian de Greef <ldegreef@uw.edu>