Mobile Phones as Pointing Devices

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Overview

- Introduction / Motivation
  - Large Public Displays
  - Phones vs. Other Interaction Techniques

- New Phonecam Interaction Techniques
  - Sweep
  - Point & Shoot

- Future Directions
  - Potential Improvements
  - Deployment Opportunities

- Demo
Interaction with Large Displays

Personal

Semi-Public

Public

Tico Ballagas

Mobile Phones as Pointing Devices

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media computing group
Potential Applications

*Large Public Displays*

- Games
- Interactive art
- Digital bulletin boards
- Advertising
Direct surface interaction

- Clear affordance
- One-to-one mapping
- High Serendipity

But…

- Physical Security
- Scalability
- Perspective
- Sanitation / Maintenance
- Multi-user
Mobile Phones

- Inherent Multi-user support (1 device / person)
- Physical Security not an issue
- User familiarity
- Connectivity standards
- Many built-in sensors / actuators
Mobile Phones for Pointing Tasks

Two Camera-based Techniques

- Sweep
- Point & Shoot
Sweep

- Optical Flow Technique
  - Allows the phone to be used like an optical mouse
- The joystick is used as a clutch
  - Allows user to reposition arm
- User can focus attention on the large display
Mobile Phones as Pointing Devices
Point and Shoot

- Aim using cross-hair cursor on phone screen
- Take a picture
- Item that you selected through the camera lens becomes selected on the large display.
Mobile Phones as Pointing Devices
Visual Codes

- Arbitrary
  - Orientation
  - Tilt
  - Rotation

- In Point & Shoot they are used to derive coordinate system on the display surface.

- Currently 83 bits
Example Scenario

Example Diagram
Performance Evaluation
Improving Interactions

- Strategies for combining sensors
  - Camera + Accelerometer
- Improved Optical Flow algorithms
  - Higher Resolution
  - Faster Sample Rate
Deployment Opportunities

- eCampus
- REXplorer