

A Field Study on Spontaneous Gaze-based Interaction with a Public Display using Pursuits

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Evolution of Public Displays



Evolution of Public Displays



source: http://en.belavia.by/passengers/tickets/fly_rail/



source: <http://thetechjournal.com/off-topic/>

Evolution of Public Displays



Gaze interaction with Public Displays

Gaze is particularly useful for Public Displays! [Khamis et al. pd-apps 2015]

But..

Most eye trackers are designed for desktop settings

e.g. eye trackers require calibration!

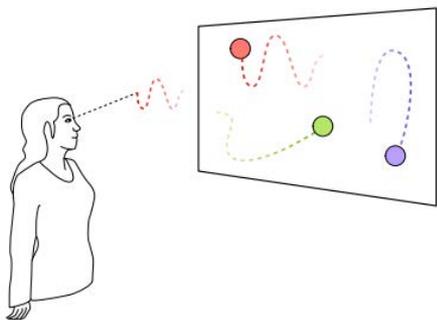
Why not calibrate?

Public displays have to be immediately usable! [Müller et al. 2012]

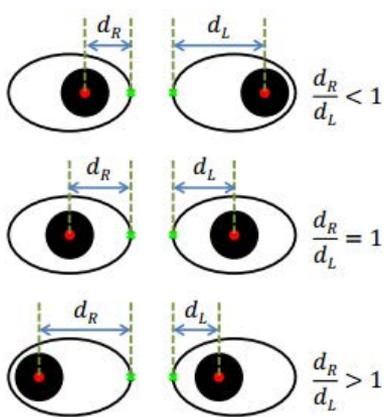
Calibration is negatively perceived by users [Majaranta and Bulling 2014]

Public displays cannot afford calibration time!

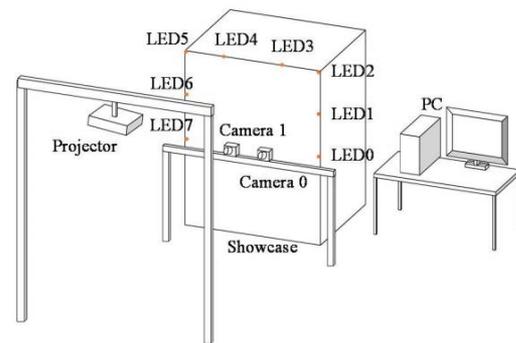
Existing workarounds



Smooth Pursuits
[Vidal et al. UbiComp 2013]



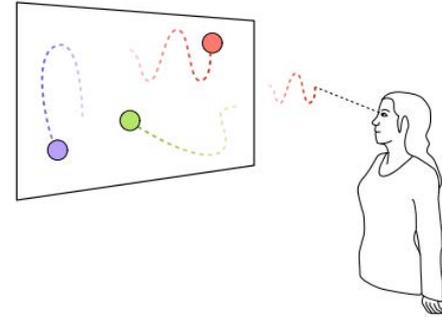
SideWays
[Zhang et al. CHI 2013]



[Nagamatsu et al. PerDis 2014]

Smooth Pursuits

- Does not require calibration
- Offers wider range of UI elements



Smooth Pursuits
[Vidal et al. Ubicomp 2013]

In-the-Wild study of Pursuits

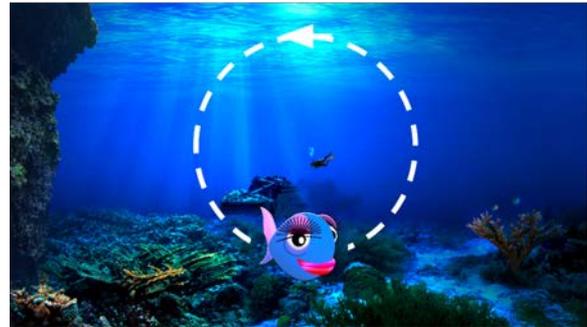
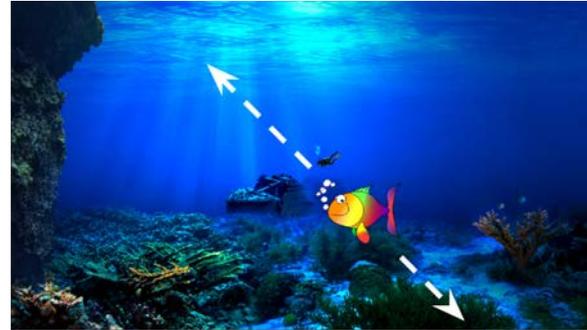
- Study the effects of object's **trajectory** and **speed** on selection time
- Collect qualitative feedback from users
- Observe users behavior as they interact

The EyeFishing game



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The EyeFishing game - Walkthrough



Study design

- We manipulated the fish's
 - **Trajectory** type: linear vs circular
 - **Speed**: fast vs slow -- 650px/s vs 450px/s -- 12.25°/s vs 8.5°/s

- We used system parameters similar to previous work [Vidal et al. UbiComp 2013]
 - Window size = 500ms
 - Used Pearson's correlation, with threshold = 80%

Evaluation - Procedure

- 2-days deployment
- We visited the deployment every now and then
- Observed participants were asked for feedback

Evaluation - Interactions

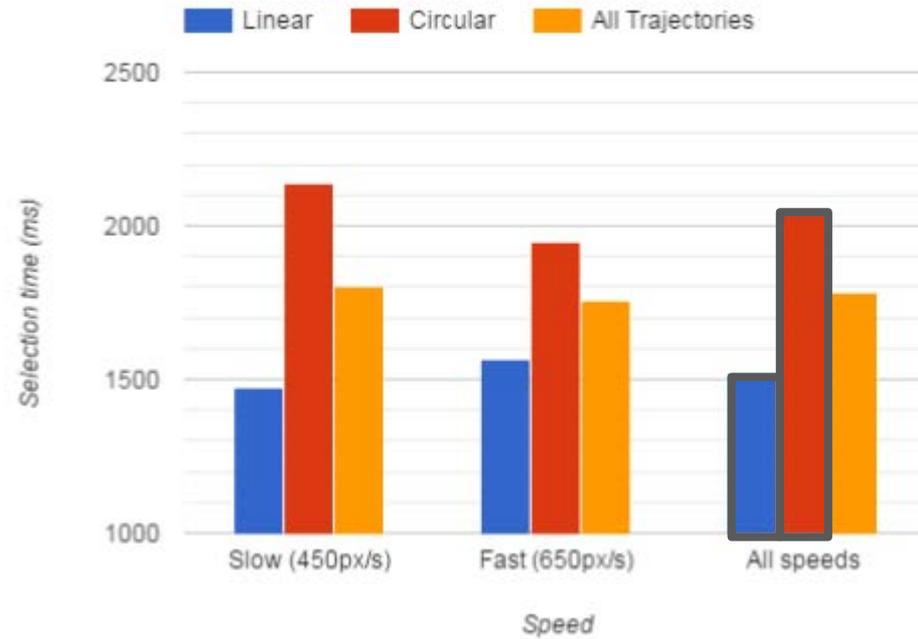
- 56 interactions
- Interviewed 12 participants
- The majority were students

Evaluation - Results

Significant main effect of **trajectory** type on *selection time*: $F(1,37) = 10.618, p < 0.05$

Linear trajectories (M=1.5, SD=1.3) are significantly faster to select than **circular** trajectories (M=2.0, SD=1.6)

No significant effect for fish **speed** on *selection time*.



Evaluation - Observations

- Passersby approached in groups
- Skepticism towards interacting alone
- Very tall, and very short users faced problems

Evaluation - Interviews

- Interaction was well perceived: “Interesting”, “Fast”, “Easy”
- 10 out of 12 noticed different trajectories
- None perceived any difference in selecting different trajectories
- 1 out of 12 noticed the different speeds

Future work

- Effect of number of objects
- Try out different trajectories (e.g. zigzag)
- Does gaze really reduce social embarrassment?

Take Home Messages

- Pursuits is well perceived by users
- Users could still be skeptical towards using gaze interaction in public
- Pursuits parameters can vary greatly!

Thank you!

