

PicoTales: Collaborative Authoring of Animated Stories using Handheld Projectors

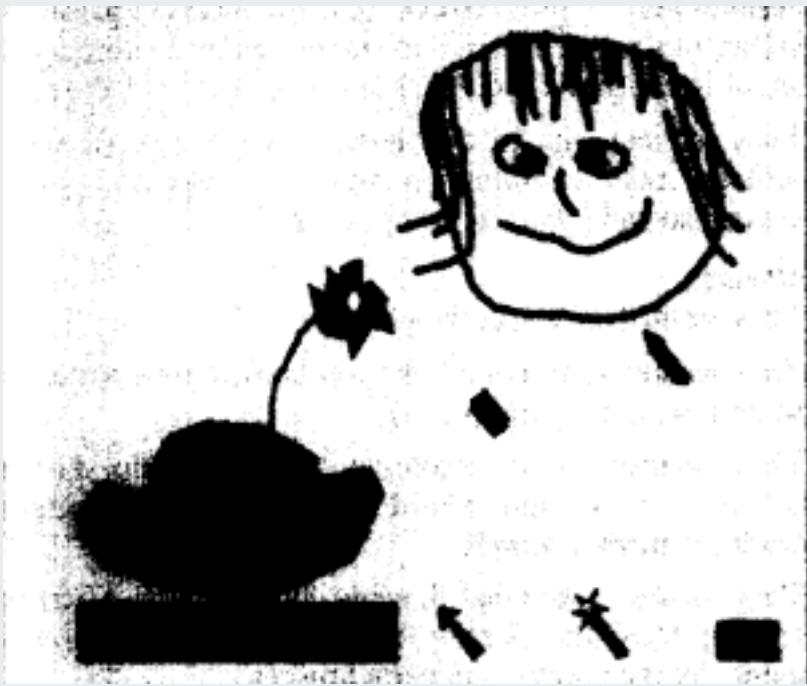
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KidPad (Druin et al.)



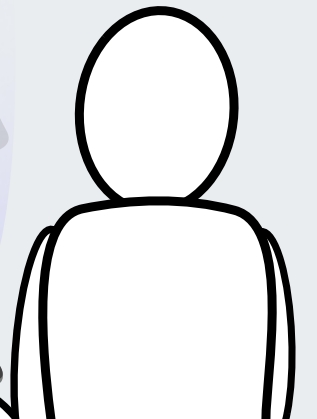
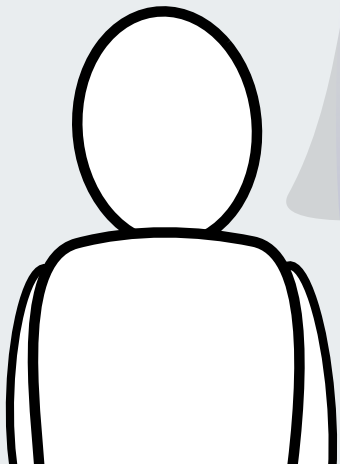
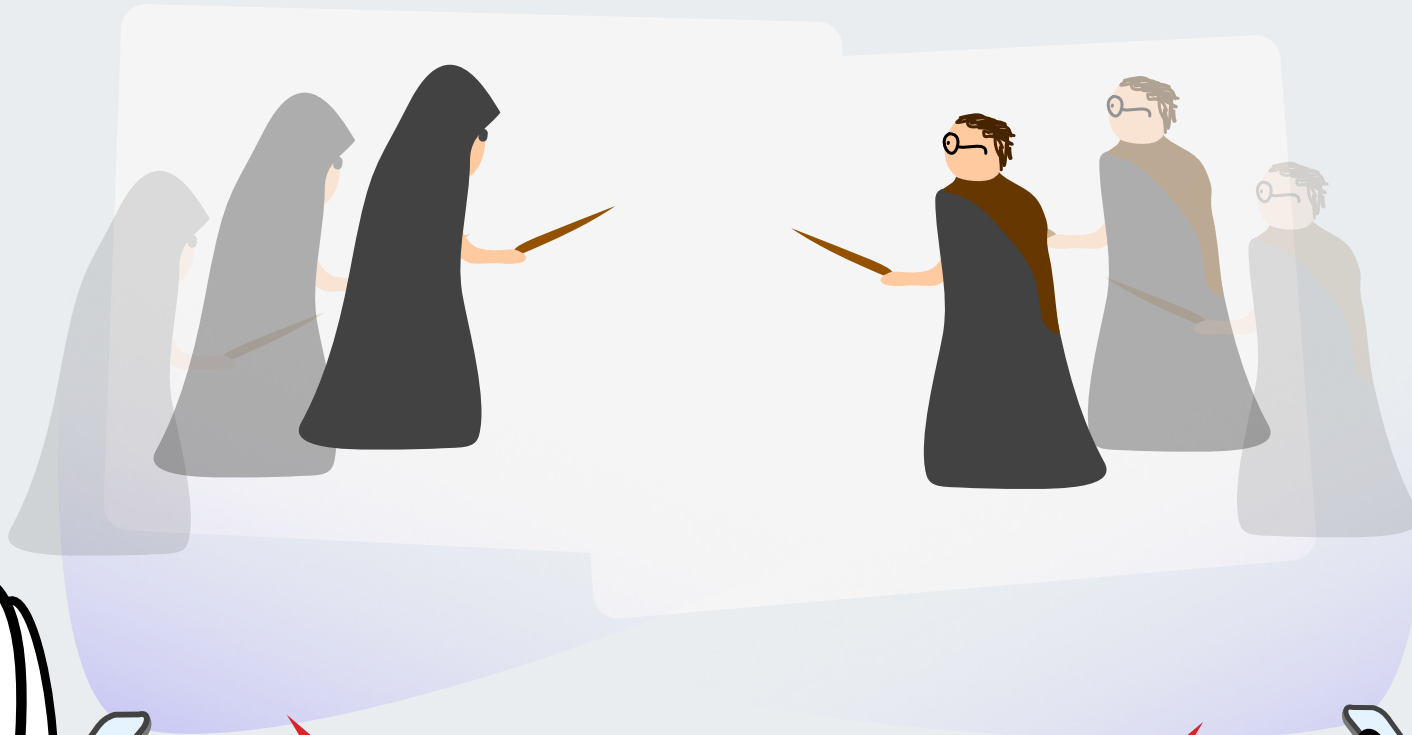
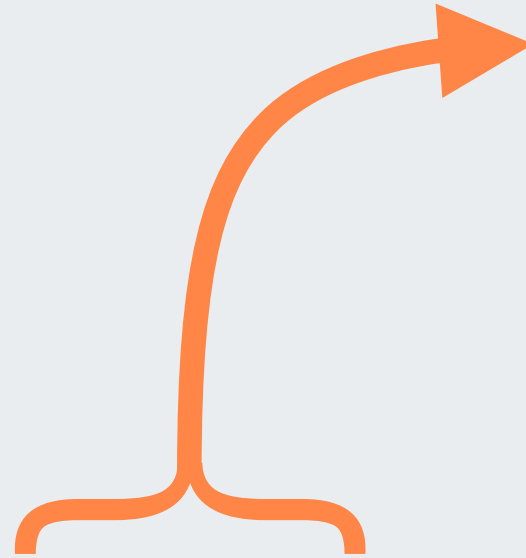
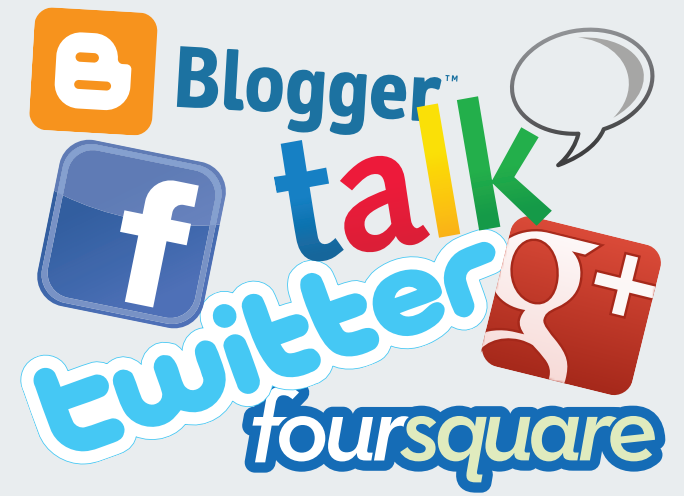
TellTable (Cao et al.)



Mobile Stories (Fails et al.)



UbiSketch (Weibel et al.)

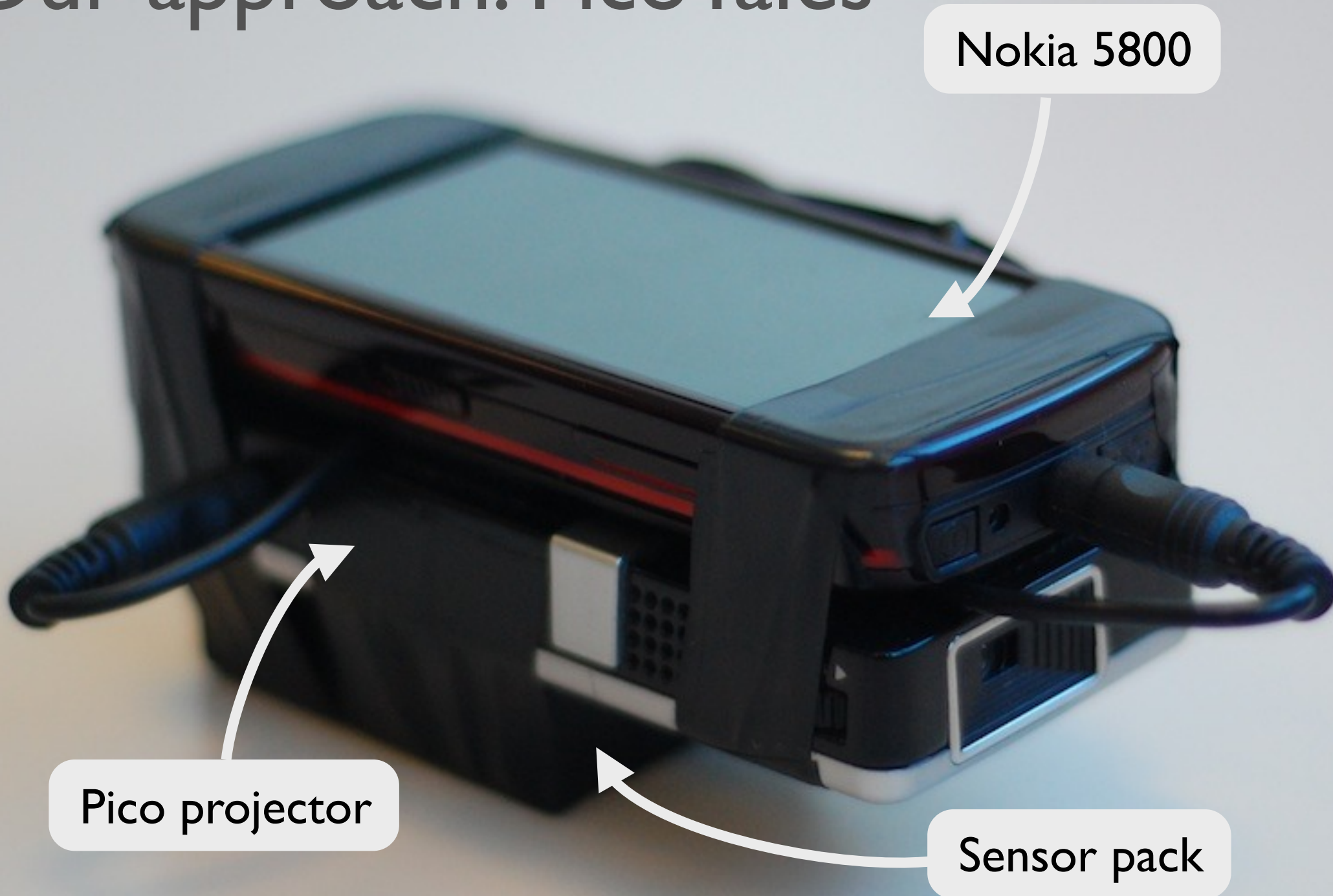


Background

- Handheld projector interaction – Cao et al.
- Multi-user handheld projection – Willis et al.
- Projected collaboration – Shilkrot et al.
- Flashlights, lasers – Ghali et al., Olsen et al.

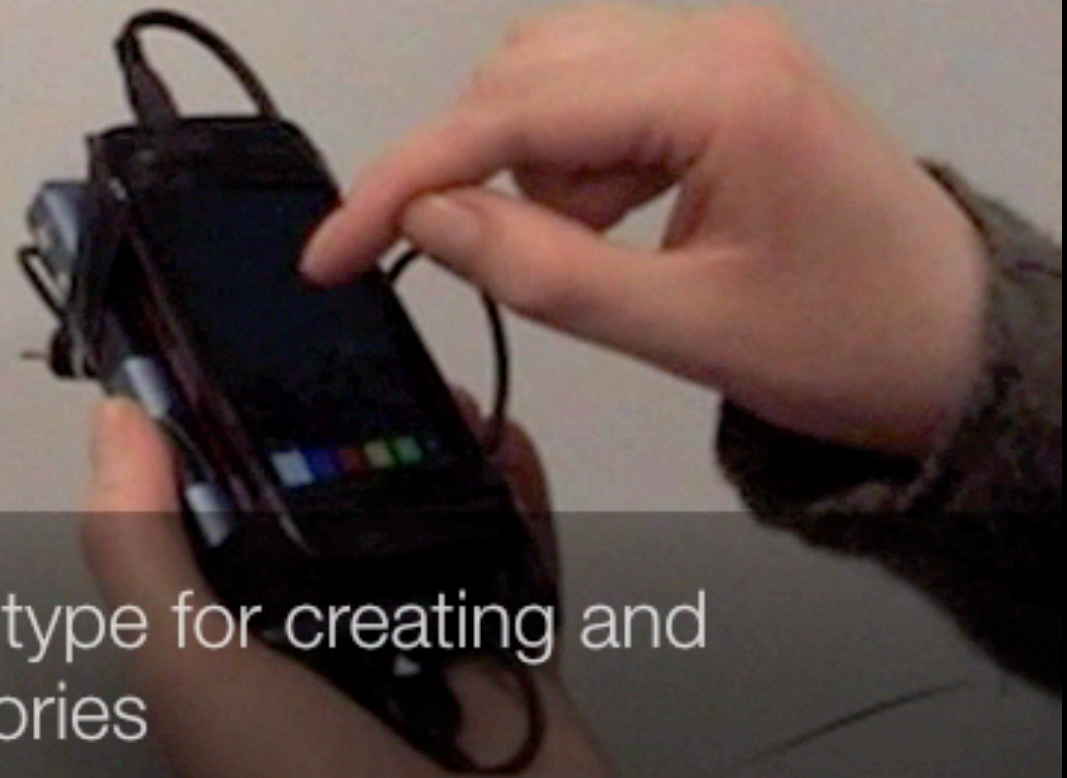
- Sensor-based mobile spatial interaction – Williamson et al.

Our approach: PicoTales





(interaction video)



Picoprojector+phone prototype for creating and animating sketch-based stories

Benefits

- Sketch storytelling anywhere
 - No extra tracking systems required
- Automatic recording & rendering of projected content for later reuse
 - Projection as input

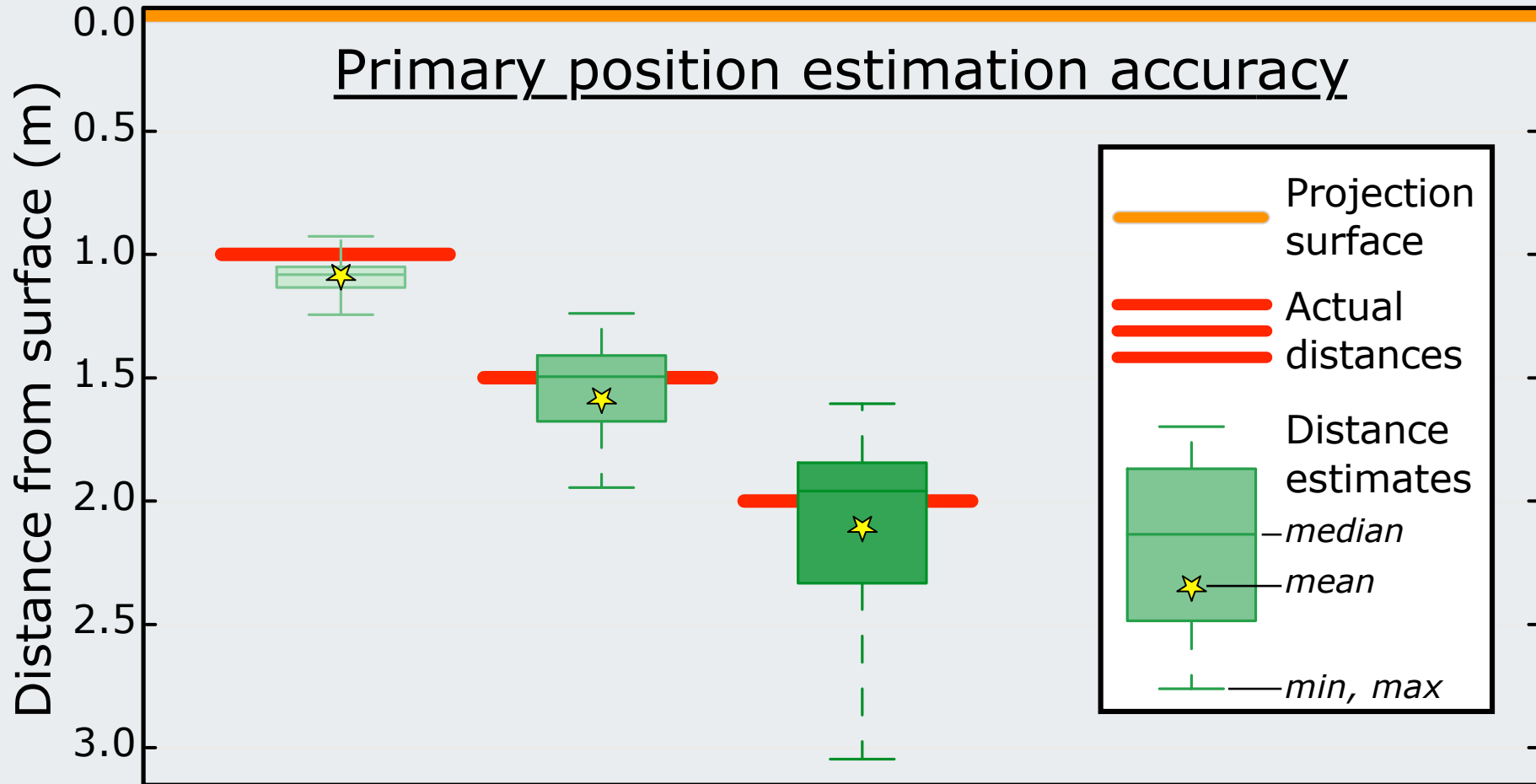
Research questions

- 1: Technical: *Can we track story authors' positions and movements accurately enough?*
- 2: Authoring: *How do people use the system to animate stories?*
- 3: Viewing: *To what extent can other people understand the stories that are created?*

Technical evaluation

- Q1: *Can we track story authors' positions and movements accurately enough?*
- 16 participants (8M; 8F), working in pairs
- Calibration tasks:
 - 3 distances from a wall; 5 distances from each other
- Tracking tasks:
 - 3 distances from a wall; 14 target markers

Technical: results

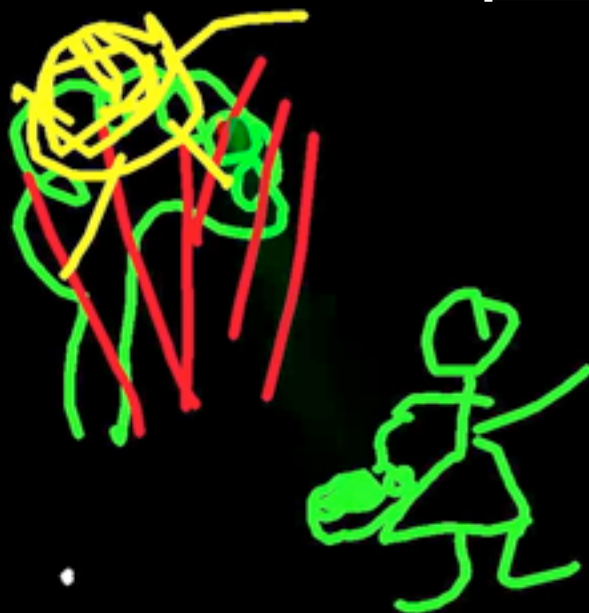


- Closer = more accurate

Authoring evaluation

- *Q2: How do people use the system to animate stories?*
- 6 pairs of story authors
- Sketch a story; move to animate
- No pre-planning
- Narrate while authoring
- Think aloud during playback

Authoring: results



Authoring: results



And because we like the young lady,
we think we should have a nice sort of sun

(animation video)

Authoring: results



Okay, and you could change to a seated man

(animation video)

Authoring: results



Shall I draw all the King's men behind it?

(animation video)

Authoring: results

“The simplicity is a good thing, because it takes away the focus on the technology rather than the story”

“Overall the drawing was fine but the positioning was slightly off”

“The likeness is spot on but they’re not quite in unison”

“I liked it; I wanted to draw more than one character at once”

- Projection technique appreciated
- Simple interface can be a benefit
- But: tracking accuracy improvements needed

Viewing: results

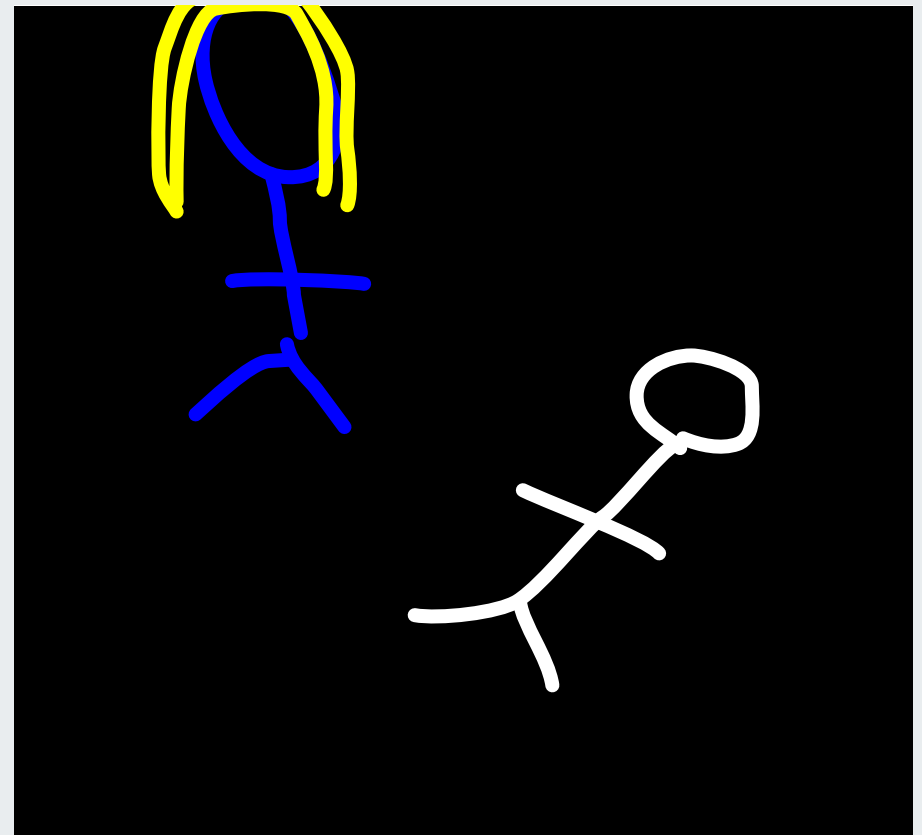
Measure	Result
Understanding	4.7 (sd: 1.7)
Do sketches match story	4.7 (sd: 1.5)
Usefulness of animations	4.0 (sd: 1.7)
Were interactions meaningful	4.0 (sd: 1.6)
Was low resolution a problem	3.3 (sd: 1.8)

Viewing: results

- Story understanding & meaningful sketched interactions depended on sketch quality



vs.



Summary

- Sensor-based tracking shows potential
- Accuracy improvements needed for more effective authoring
- Stories are still understandable by other people who have no experience of the system

Future work

- Technical:
 - Accuracy improvements
 - Interface enhancements
- Authoring:
 - Post-storytelling editing
- Performative projection

Thank you

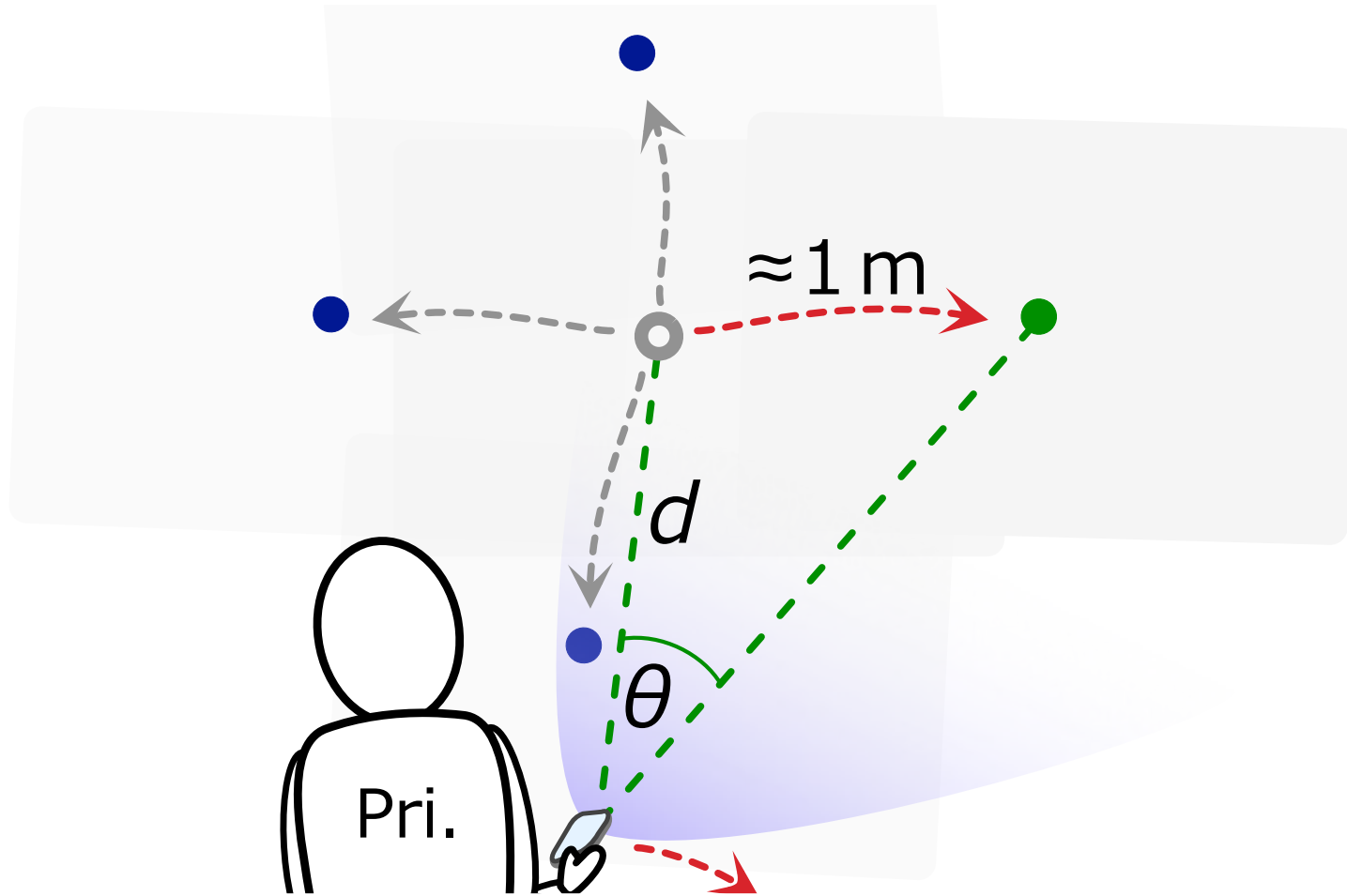
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Research funded by EPSRC projects
EP/J000604/1 and EP/I001778/1.

Elina Vartiainen was supported by
The Wihuri Foundation.

Technical: distance estimation

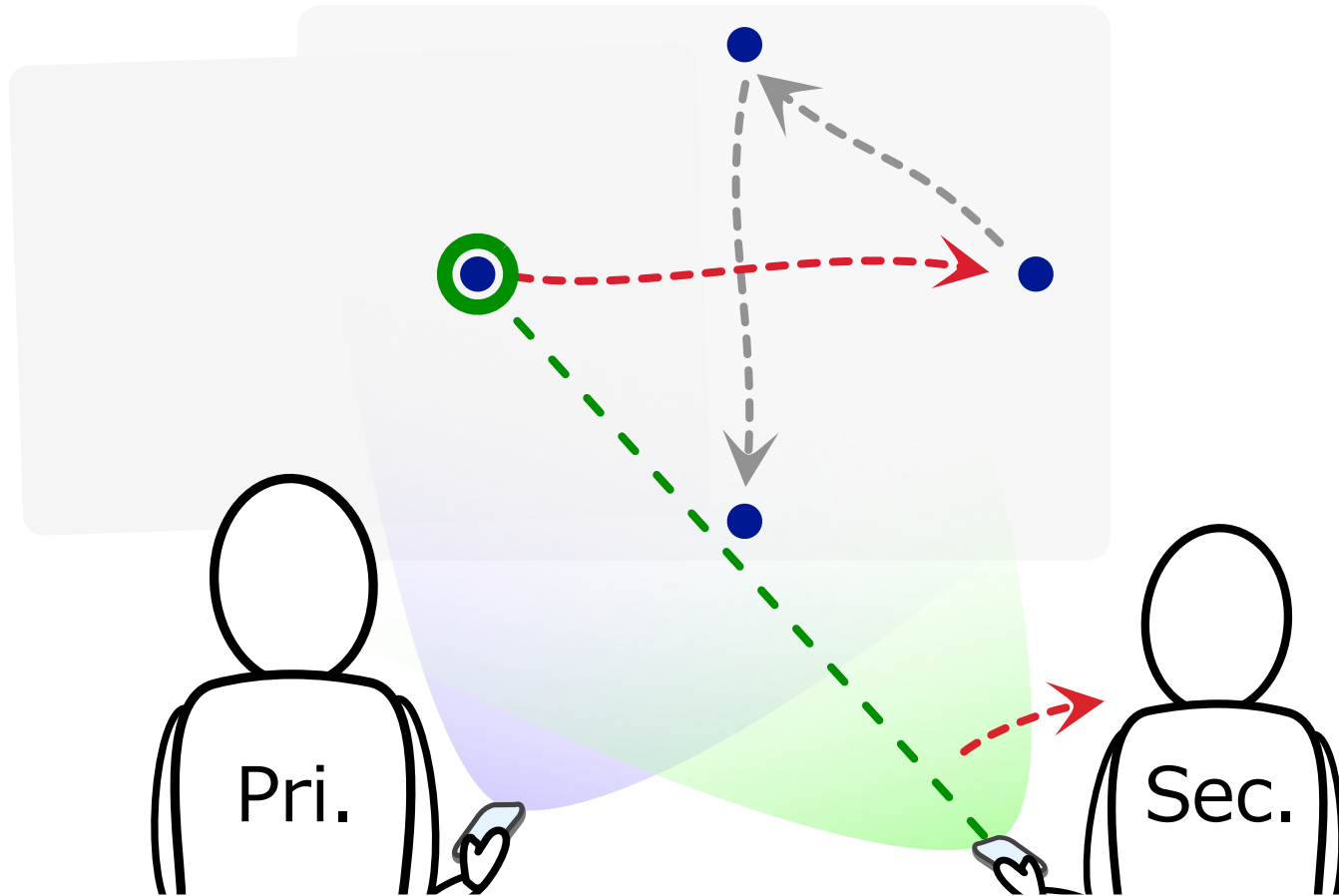
1



- Sensor-based, rather than video-based

Technical: distance estimation

2



- Sensor-based, rather than video-based