



Research Question

What hand gestures are best suited for navigation in micro-task crowdsourcing?

1. Background

- **Micro-task crowdsourcing** is a type of work where people complete small tasks to earn money. The tasks are usually simple and take only a few minutes to complete.
- We want to provide **alternative input modalities** for crowd workers, who can suffer injuries from excessively performing repetitive tasks [1].
- **Webcam-based hand-tracking** can be used to take a break from keyboard and mouse usage.
- Look into how to use hand tracking to **navigate through crowdsourcing work environments** (CSWEs), which means browsing available tasks and progressing through subtasks.

2. Method

We decided what type of hand gestures to test the following way:

- Categorize all types of hand gestures according to the taxonomy proposed by Vuletic et al. [2]: *Effect, Time, Focus and Space*.
- Effect divides gestures into *discrete* and *continuous*.
- Time divides gestures into *dynamic* and *static*.
- This gives us three types to test: *discrete dynamic*, *discrete static*, and *continuous dynamic* gestures. (*continuous static* gestures don't exist)

Crowdworkers on the CSWE *Prolific* tested 5 methods of using hand gestures by following a video.*

- (1) Choosing tasks by emulating the cursor
- (2) Choosing tasks by swiping left and right
- (3) Choosing tasks by holding thumbs up or down
- (4) Progressing through tasks by swiping left.
- (5) Progressing through tasks by pointing right.

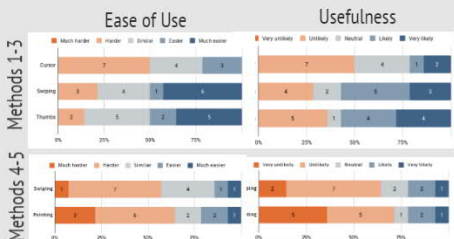
They then rated them on **ease of use** and **usefulness**.

*<https://youtu.be/3pYPx2ASa80>

Investigating Webcam-based Hand-tracking for Navigation in Micro-task Crowdsourcing

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3. Results



4. Conclusion

- The mouse-simulating method with continuous hand gestures was not deemed easy nor useful.
- Crowdworkers are likely to use discrete dynamic and discrete static hand gestures for choosing tasks.
- Crowdworkers are not likely to use any hand gestures for moving between subtasks

5. Discussion

- Accepting tasks in batch instead of working right after accepting might not work for CSWEs with time-sensitive tasks.
- One participant mentioned that when solving a subtask with mouse and keyboard, they might as well use mouse and keyboard to navigate to the next subtask. Future research should combine hand gestures for navigation and for solving tasks, like researched by Ajandisz [3].
- Discrete hand gestures were most favorably received, so future research should focus on those.

6. Limitations

- Statistically insignificant result because of low sample size (14).
- Most participants only had experience with micro-tasks on Prolific, which is not known for hosting truly repetitive and straining micro-tasks like those found on other CSWEs like Amazon MTurk.

References

- [1] Alwin Luttmann, Klaus-Helmut Schmidt, and Matthias Jäger. Working conditions, muscular activity and complaints of office workers. *International Journal of Industrial Ergonomics*, 40(5):549–559, 2010.
- [2] Tijana Vuletic, Alex Duffy, Laura Hay, Chris McTeague, Gerard Campbell, and Madeleine Grealy. Systematic literature review of hand gestures used in human computer interaction interfaces. *International Journal of Human-Computer Studies*, 129:74–94, 2019.
- [3] Andris Ajandisz. Investigating gestures of the body as means of input modalities in crowdsourced microtasks.

