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COSC 441 - Lab 2 Report

**Chosen Study Values:**

| | |
|---|---|
| Distractor Target Widths | 0.5, 0.75, 1 |
| Number of Distractor Targets | 20 |
| Start and Goal Target Sizes | 0.25, 0.75 |
| Target Amplitudes | 3, 5 |
| EW to W Ratio | 1.25, 2 |

**Rationale for the number of chosen conditions for each factor as well as the chosen values for each condition.**

My rationale for my chosen values is largely based on the aspect ratio of the screen I will conduct the study on (1920x1080), and chosen values were picked so that the ratios of targets and density fit within this screen size.

For the distractor targets widths, I chose 3 different sizes of 0.5, 0.75, and 1. The reasoning for this was to ensure that they were large enough to obstruct portions of the screen, but not so large that it obstructs too much of the play area and becomes overwhelming for the test user.

The rationale for the number of distractor targets follows this reasoning, I wanted there to be enough distractors to be similar to the original paper while not being too overly dense so that the utility of the bubble cursor's dynamic growing and shrinking area could be properly showcased. If you have too many distractor targets in a very dense area the bubble cursor is not able to expand large enough for it to be useful.

For the Start and Goal target sizes I chose the values 0.25, and 0.75. The reasoning for this was to showcase a variety of easy large targets and smaller harder to select targets. A width of 0.25 demands much more precision when using the point cursor whereas the 0.75 width target proved to be much easier to select.

The rationale for target amplitudes 3 and 5 was to provide a variety of targets closer to the center of the screen and further away. An amplitude of 3 was around the closest I thought would be reasonable to select without becoming extremely easy for participants. An amplitude of 5 was close to the furthest distance away from the borders of a 1920x1080 screen.

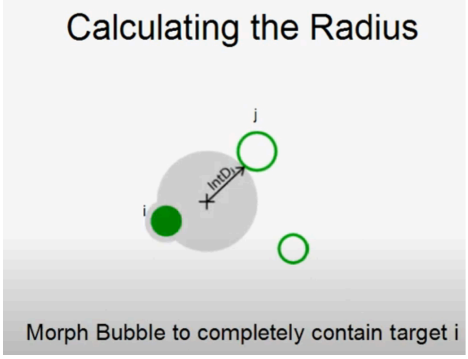
For my chosen EW to W Ratios I wanted to showcase the 4 distractor targets from a closer distance and one that was further away for added variety and in order to test the effectiveness of the bubble cursor. During testing I found that a smaller ratio made the 4 distractor targets too

close, while a larger ratio made them too far away to challenge the participants ability to select more precise targets.

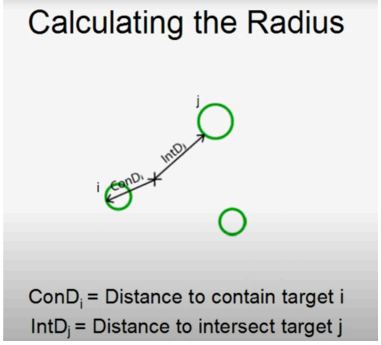
In conclusion, the chosen conditions and values for each factor were selected to maintain a balance between complexity and usability, while ensuring that the experimental setup fits within the constraints of the screen resolution (1920x1080). The varying widths, amplitudes, and ratios offer enough diversity to test the effectiveness of the bubble cursor without overwhelming participants or skewing results due to extreme conditions. This design will allow for a thorough evaluation of both large and small target selection, demonstrating the strengths and weaknesses of the cursor system under different task conditions.

**Discussion of any implementation details (if any) that differ significantly from those described in the original paper.**

Unfortunately I was not able to properly implement the following edge case from the original paper:




However the remainder of my implementation remains more or less the same, and calculates the cursor radius = MIN(ConDi, IntDj) as show here:




The only other issue I ran into was saving the MT of the first target selection and I was not able to resolve it properly in time. I have attached sample data below and which is also zipped in the lab 2 folder:

| PID | CT | A | W | EWW | MT | MissedClicks |
|---|---|---|---|---|---|---|
| 1 | BubbleCur | 3 | 0.75 | 2 | 0 | 0 |
| 1 | BubbleCur | 3 | 0.25 | 2 | 1.900977 | 0 |
| 1 | BubbleCur | 5 | 0.25 | 1.5 | 1.703034 | 1 |
| 1 | BubbleCur | 3 | 0.25 | 1.5 | 1.158458 | 0 |
| 1 | BubbleCur | 5 | 0.25 | 2 | 2.475002 | 2 |
| 1 | BubbleCur | 5 | 0.75 | 2 | 1.026556 | 0 |
| 1 | BubbleCur | 5 | 0.75 | 1.5 | 1.441969 | 1 |
| 1 | BubbleCur | 3 | 0.75 | 1.5 | 1.423391 | 0 |

| PID | CT | A | W | EWW | MT | MissedClicks |
|---|---|---|---|---|---|---|
| 1 | PointCurs | 3 | 0.75 | 2 | 0 | 0 |
| 1 | PointCurs | 3 | 0.25 | 1.5 | 1.731467 | 0 |
| 1 | PointCurs | 5 | 0.75 | 2 | 0.915237 | 0 |
| 1 | PointCurs | 5 | 0.75 | 1.5 | 0.8447 | 0 |
| 1 | PointCurs | 5 | 0.25 | 1.5 | 0.904902 | 0 |
| 1 | PointCurs | 5 | 0.25 | 2 | 1.090683 | 0 |
| 1 | PointCurs | 3 | 0.75 | 1.5 | 0.740482 | 0 |
| 1 | PointCurs | 3 | 0.25 | 2 | 0.956754 | 0 |