**Evaluation Report**

**Background Summary:**

1. I tested a game on three different ways to play by using (TUIO markers, Finger Movement, and AR visualizations.).
2. The test was held on 21/12/2023 in a playground on Children aged 5-13. We used laptop, TUIO markers, pieces of a puzzle with animals on a side, and a TUIO marker on the other side, mobile phone for TUIO Server Camera and our fingers.
3. We used gaze tracking and facial expression to monitor the user reaction and engagement.
4. The testing team was Yahia Salah, Mahmoud Wael as game developers.
5. Problems:

* Finger detection movement of the animals was smooth but the boxes where they should be placed were a bit buggy.
* The TUIO Markers were big enough for the camera to detect clearly, but the screen was too big and the coordinates from the camera didn’t cover the whole screen.
* As in gestures, the camera range is smaller than the screen.

|  |  |  |
| --- | --- | --- |
| Name | Hand detection(seconds) | TUIO  (seconds) |
| Layan Tamer (6 Y\O) | 40 | 42 |
| Ziad Tamer (13 Y\O) | 37 | 25 |
| Marawan Ibrahim (12 Y/O) | 36 | 40 |
| Anas Ahmad (8 Y\O) | 41 | 42 |
| Wael Mohammed (8 Y\O) | 22 | 40 |
| **Average time** | **35.2** | **37.8** |

**Methodology**:

1. The kids are gathered around us for the experiment.
2. Each game is explained to all users before starting the game.
3. They test the game by organizing the animals in their correct place.

**Results:**

The rank of the game methods from best to worst:

1. Color Filter
2. Hand Gesture
3. TUIO

Time Taken to organize all objects

0

5

10

15

20

25

30

35

40

45

Abdelrahman Mohamed

Mostafa Osama

Mohamed Mortaga

Mahmoud Ebrahim

Ziad Mostafa

Time Taken to Organise Objects

Color Filter

TUIO

Hand Gestures

|  |  |  |  |
| --- | --- | --- | --- |
| Statistics | Hand Gesture | TUIO | Color Filter |
| Average | 35.2 | 37.8 | 26.8 |
| Variance | 58.7 | 52.2 | 39.7 |
| Standard Deviation | 7.67 | 7.22 | 6.3 |

0

10

20

30

40

50

60

70

Average

Variance

Standard Deviation

Statistics

Hand Gesture

TUIO

Color Filter

The users’ tracked emotions during the games were generally neutral and happy. Only with TUIO markers they were confused because the markers would not be detected at times because of the phone camera. For their eye gaze all users were focused in the center at all times except when they had to ask for instructions when the TUIO markers would not be detected or they want to ask about something.

**Learnings:**

The TUIO markers were the hardest as the phone camera under the table was not too accurate. Using the finger movement of animals was the fastest and easiest way and the AR visualization was fun and interesting for the children. So overall it was a good interaction.