Evaluation

Background Summary:

1- I tested a game on three different ways to play by using (TUIO marker, color filter and gestures).
2- The test was held on 29/12/2022 at MSA University on college students aged 20-22
3- We used laptop, TUIO markers, black ear buds for color filter and our fingers.
4- We used gaze tracking and facial expression to monitor the user reaction and engagement.
5- The testing team was Ahmed Emam, Omar Labib and Mohamed Adel as game developers.
6- Problems:
    a- In color filters, the black color may get false detection from other dark objects in frame.
    b- As in gestures, the camera range is smaller than the screen.
    c- With TUIO markers, they were small and hard to move around.

Methodology:

1- Players are in the Study room for the experiment.
2- Game is explained to all users before starting the game.
3- They test the game by organizing the objects 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

Name	Hand gestures (sec)	TUIO (sec)	Color Filter (sec)
Abdelrahman Mohamed	40	42	30
Mostafa Osama	37	25	23
Mohamed Mortaga	36	40	34
Mahmoud Ebrahim	41	42	29
Ziad Mostafa	22	40	18
Average time	**35.2**	**37.8**	**26.8**

Time Taken to Organise Objects
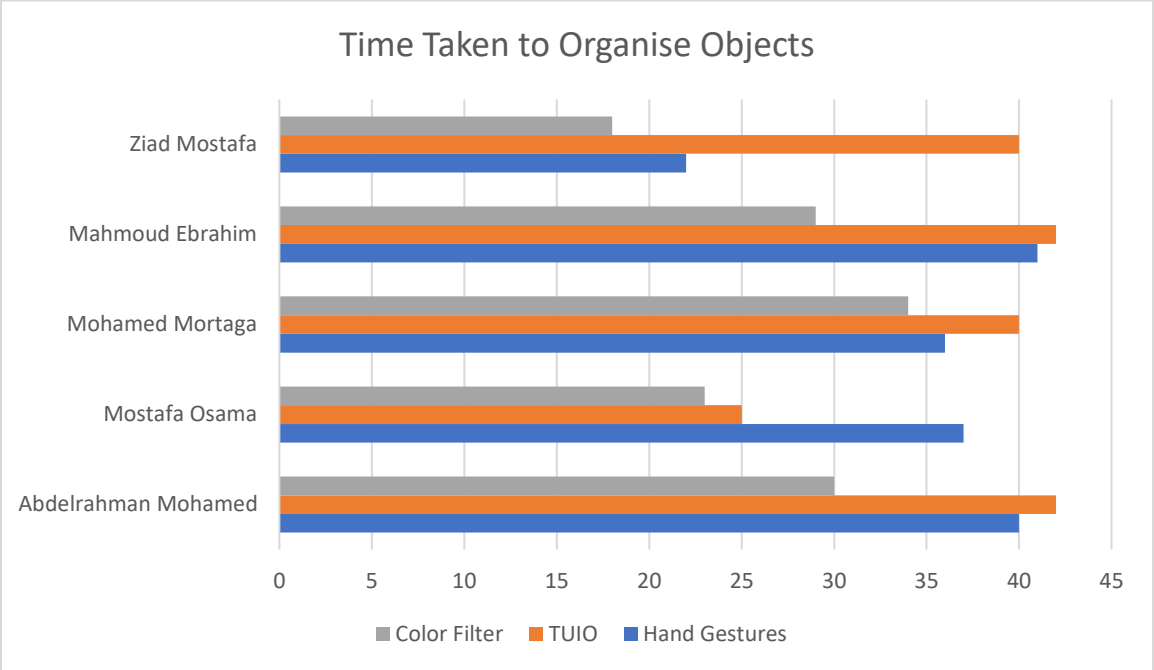
Statistics	Hand Gesture	TUIO	Color Filter
Average	35.2	37.8	26.8
Variance	58.7	52.2	39.7
Standard Deviation	7.67	7.22	6.3
ANOVA	F = 3.3		

Statistics
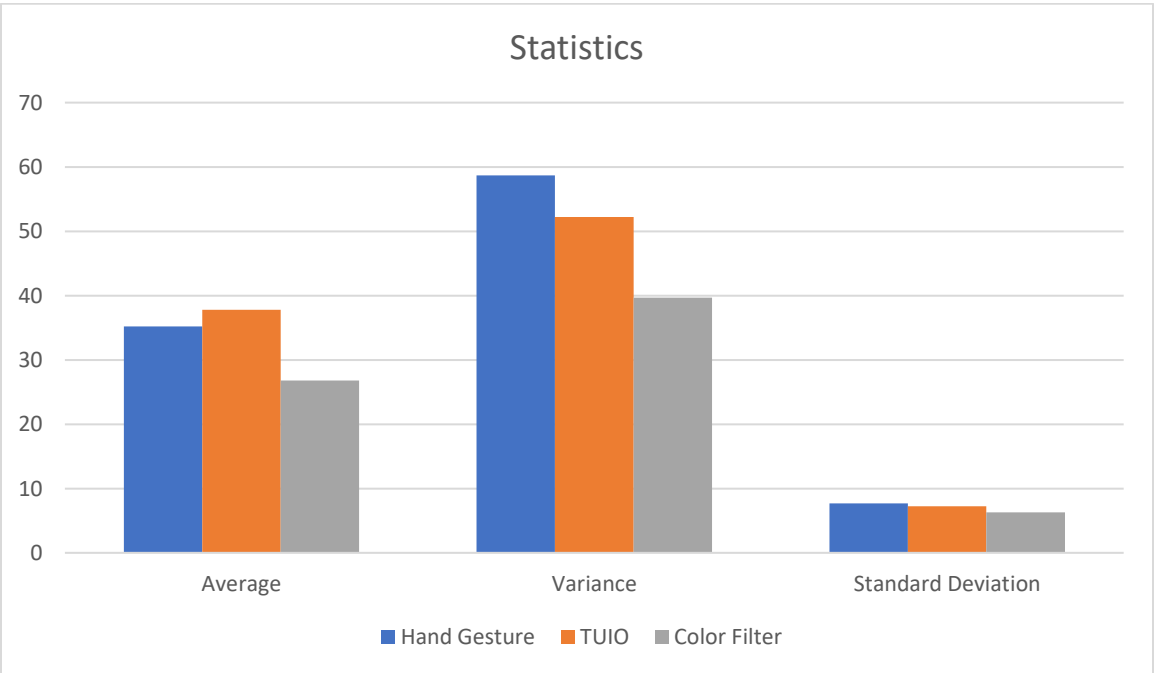
The users' tracked emotions during the games were generally neutral and happy. Only with TUIO markers they were surprised because the markers would not be detected at times.
For their eye gaze all users were focused in the center at all times except when they had to ask for instruciton whhen the TUIO markers would not be detected.

<u>Learnings:</u>

The TUIO markers were the hardest as the printed markers size was too small. Using the color filter was the fastest and easiest way and the hand gesture was a natural interaction so it was a good interaction.