New Technology

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Concept 1

Why did we choose the Tobii eye tracker:

1. It's accurate and it's easy to set-up.
2. Wanted to know if it could be a faster mode of input and how different does it feel than using the traditional inputs or with using the traditional inputs. Also because we have been using other peripherals so many times. Does a new technology bring comfort or adds new challenges with it?
3. We as a team wanted to know and imagine the possibilities of this technology.
4. We wanted to know different applications of eye tracking in gaming.

What can you do with the Tobii eye tracker that you can't do in a normal pc game?

1. The eye movement as an input is something which remains unexplored. In a day to day life, we are never conscious about the eye movement, because it is very natural to us.
2. Eyes move fast, we can use this property which would not be possible using a mouse or controller.
3. It can add an extra layer of immersion.

How did we explore the technology:

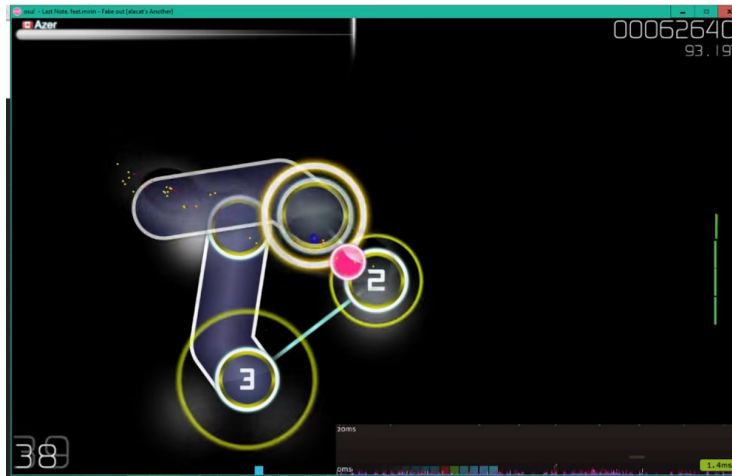We tried using Tobii eye tracker with the games we thought would be played better using this technology.
Inspiration:
Slenderman Tobii eye tracker

This game instantly came to our mind, because we assumed that a horror game will be complemented with the level of immersion provided by the eye tracker.
We played this game using a mouse, keyboard and eye tracker.
Navigation using eyes became easier because the torchlight was controlled by the eyes and also the field of vision. The screen moved automatically wherever you see.

Osu with the eye tracker

With this experiment, we wanted to check if the Tobii eye tracker can replace mouse as a basic input.
The game became extremely difficult to play only using eye tracker, mainly because of the calibration and delay.

for honor with the eye tracker

Normally in "for honor" you have to give your attacks a certain direction, but when using tobii eye tracker you can do this instantly with the eye tracker by looking at the direction you want to hit. It works really smoothly and makes hitting combo's slightly easier.

ghost recon wildlands with the eye tracker

Ghost recon has a great integration with tobii, you can use it to aim at gaze which is probably one of the best things since this gives you way faster reaction time. It makes the UI cleaner by putting it out of focus and slightly transparent while not looking at it and probably the best thing is that you can mark enemies just by looking at them for a few seconds, the game automatically knows that you're looking at the enemy and then tracks it for you instead of having to look at them and pressing a button.

Other applications

The eye tracker is used in

Market Research – gives natural consumer behaviour.

User Experience - Eye tracking can be used to study the way in which platforms and services are used and how effectively they deliver their goals. Eye tracking can reveal design flaws and even methods of use which may not have been evident in the creative process.

Ideation

Game mechanics eye tracker can enhance

Because it is all about looking at the screen, the core mechanics could be to not look at something or looking at something. The examples which we thought of were:

1. Where's Wally? is a British series of children's puzzle books created by English illustrator Martin Handford. The books consist of a series of detailed double-page spread illustrations depicting dozens or more people doing a variety of amusing things at a given location. Readers are challenged to find a character named Wally

hidden in the group.
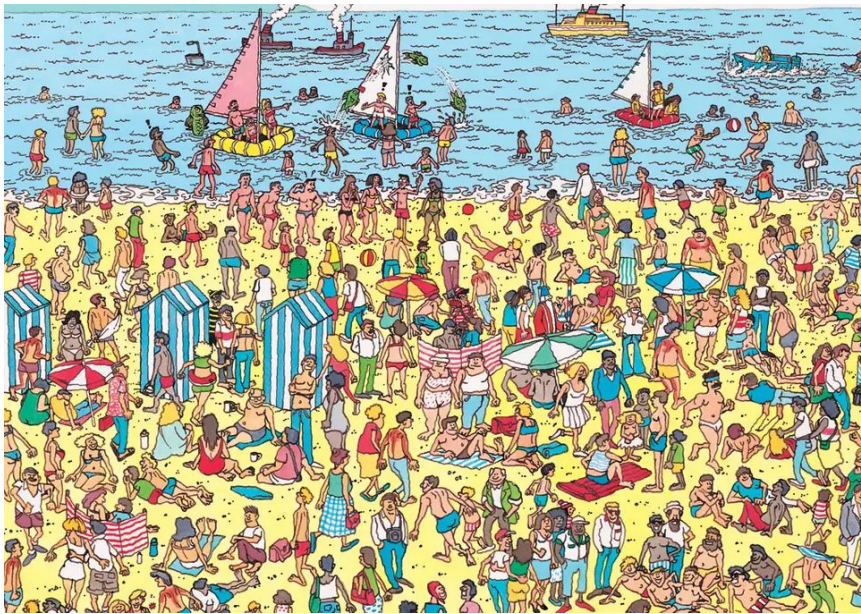
2. We assume that a horror game will work well with the eye tracker because eye trackers capture the natural behaviour of the player. Horror games have to do a lot with how the player might react to jump scares.

Game Concept:

A witch who is pretty at the day, but at night she shows her real face. A handsome young man fell in love with the pretty lady and took her on a date. The witch lost a sense of time when she was overwhelmed with the gifts. At the sunset, she hurried to her house. The man followed her even if she had warned him. He enters the house. But she doesn't like trespassing, afraid that he would look at her ugly face she is ready to kill him on the spot. Don't look at her!

The game will comprise a map of a house which will have 8 rooms:

8 rooms:
1. Locked room
2. Bathroom
3. Kitchen
4. Dining
5. Pretty bedroom
6. Living room
7. Guest room
8. Children room (her dead kid's prized possession, but she sacrificed him)
9. Cellar (Player escapes from here)
    Corridor, Stairs, Bats, Witch laughter, rats, lizards, Witch photos with different men.

The player is supposed to Initially explore all the rooms, then find the clues to get out of here. To get out the player needs to go to the locked room to get a chainsaw to get out from the cellar.

The Tobii eye tracker will be helping the player out by adding more immersion.

1. The rooms will be dark and the player will be able to see using a torchlight which will be controlled by the eye movement. The torchlight will be a soft light and hence would not have any problem of calibration.
2. The game will have a first-person view and hence can use the eye tracker to extend the view of the screen of the game. That is the player moves his eyes to look at a part of the game which is currently not on the screen.

Both of these features are natural and can complement the dark and horror theme.

Conclusions:

1. The technology alone as an input device would not work well enough, because of various reasons. But the tech can work wonders if combined with other existing options.
2. As observed while playing Osu only with the eye tracker, it didn't work well enough. Although we thought that because our eyes move rapidly it might be a better option than the mouse.
3. The tech, when combined with other existing options, can give the following advantages:
   a. Immersive Graphics:
      1. Clean Screen, options can pop up at gaze
         Dynamic Depth of Field, wherever the player looks the depth of field changes
         Dynamic Light Exposure
         Directional Sound
   b. Natural Targeting
      1. Cover at Gaze
      2. Secondary Weapon at Gaze
      3. Enemy Tagging
      4. Select at Gaze
      5. Fire at Gaze
      6. Aim at Gaze
   c. Gaze awareness
   d. Infinite Screen

Concept 2

Why did we choose for VR:

VR as an industry is growing faster than ever before. The immersion that VR can provide is very impressive. VR as a technology is facing challenges, where the games build are not VR specific, i.e. the games have VR mode as well. The reason is, the developers don't want to give up on the existing market and split it into two, one which has VR and the other who doesn't. The people not having VR are more than the people having VR. So naturally games specifically for VR are not getting build much.
We felt this is underutilisation of a wonderful technology and hence wanted to build a VR game which could be enhancing the VR experience by using mechanisms specific to VR.

Why did we choose the Oculus Rift:

1. Cost effective tech, so more people might have it.
2. Content available: exclusive games on their Oculus Home platform like Marvel Powers United VR and the upcoming Windlands 2, which likely drive sales and in turn result in hardware activations on Steam.

What can you do with the Oculus Rift that you can't do in a normal pc game?

In VR movement is important. Movements by hands, head and body can all be realistic. In a pc game, it is hard to make these actions immersive. You can throw objects like you would in real life, its like youre really doing it.

Why is it VR and what are the game, mechanics?

We wanted the game mechanics should be unique to VR, and hence we thought of some movement by body parts which could not be achieved by controllers.
For movements, we listed down possible areas we could work on:

1. hand movements: We didn't want to concentrate on fine motor skills like pinching because it can become frustrating. The action should be intuitive. We chose to pick up and throw as our actions, which are crude and intuitive to be done when the game pressure rises.
2. head movement: We listed down possible actions head movement can provide. Turning the head, or hitting with the head. We collectively thought head turn can be used to navigate and see the environment, but hitting with your head can be fun. When the enemies come closer the player could hit the enemies with their horn on their head.

Ideation:

Games we tried out to get a better understanding of vr and the possibilities you can get with it:

Beat saber:

Beat saber is a fast paced rhythm game where you have to slice cubes on the beat. You have the slice the cubes in a specific direction to get the most points out of it. We could use dual wielding in our game as well.

Arizona sunshine:

Arizona sunshine is a zombie survival shooter where you have to find your way through the map. On the road you encounter zombies you have to shoot in order to survive. Accuracy is really important in this game because you don't have a lot of ammo and you don't want to waste it. The best way to actually hit a zombie is by aiming with the gun down sights like you would in real life. This mechanic give it a lot of immersive experience not something you would do in a pc game because the aiming is actually pretty hard to do. You can also throw grenades as well. We thought this was a really fun mechanic that we also could implement in our game.

<u>Eve Valkyrie:</u>

Eve Valkyrie is a space battle shooter where you fly your own spaceship into battle. You have to shoot the enemies and out maneuver them. This game didn't really had mechanics that you wouldn't have in a normal pc game. But by looking around in your ship in order to spot where the enemies are is a really fun and immersive way to play this game. This game caused a lot of motion sickness as well because your not really standing on your feet but instead flying around like a maniac. Although this game was a lot of fun to play we didn't actually see fun mechanics that we wanted to implement in our game.

Game Mechanics:

Move to navigate in the space
Pick up carrots and throw at enemies
For closer combat hit the enemies with the horn on your head

Game Concept

You are in a dark forest. Your objective is to turn the dark forest into a happy colourful forest again. You have to damage the dark creatures with your happy magical damage to turn them into happy kawaii animals again.

The player is the unicorn who has a horn on his head. The player has to move his head to damage the enemy with his horn. There are also magical carrots spread across the map, you can use the carrots as rainbow grenades. The player can throw the carrots in many different ways just like you would throw an object in real life

If you damage the enemy enough (with your horn or the carrots) it will go away and you will make the rabbits happy. If you killed enough slimes the rabbits will be happy and show their gratitude towards you by jumping.

You have to survive as long as you can in order to save the forest
There will be a high score system.

Conclusion:

We wanted to have our main focus on vr because we had a immersive experience in vr. it's like you're really there your own virtual world that you can create an walk through and interact with. Also there are a lot more option to interact with vr then with the eye tracker. For example you can grab objects and throw them around. The audio is way more immersive as well. The overall experience is just way better with VR then with the eye tracker alone. That's the main reason we chose for vr. The input was really accurate as well, more accurate then the eye tracker for example. The downside of vr is that walking in vr makes you a bit motions sick, so we didn't want to make our game to long. VR as a technology has a lot of potentials but has a lot of challenges as well. We hope that vr will grow even more in the upcoming years so the immersive experience with games will be even greater than it is today.

Student's role and responsibilities:

Mick:
Role: Research and experimentation with the Tobii eye tracker and VR.
Responsibility: Concept brainstorming, part of documentation. Making a vr game in Unity and vrtk.

Shalaka:
Role: Research and experimentation with the Tobii eye tracker and VR. Documentation
Responsibility: Concept and brain storing, Documentation

Joshua:
Role: Research and experimentation with the Tobii eye tracker and VR.
Responsibility: Concept brainstorming, part of documentation.

PMI:
P:
- Easy to implement because of the vrtk plugin
- Fun to use mechanics you wouldn't use otherwise, like throwing and moving your head around

M:
- It causes dizziness after a period of time

I:
- The immersive experience is better than we thought it would be, its like youre really in the game

Assets we used for our game:

https://assetstore.unity.com/packages/3d/characters/creatures/level-1-monster-pack-77703
https://youtu.be/Bco_upzElkk