DECO3200: PORTFOLIO

By SUNG9736

PATHFINDER

Problem Statement.

"Improving safety and communication for pedestrians at night by designing an interactive zebra crossing"

With pedestrian fatalities increasing by 9.3% yearly in Australia alone, there is a clear opportunity to develop a solution that enhances the safety of pedestrians when interacting with zebra crossings particularly at night where visibility is impaired. Our aim is to improve the overall experience for pedestrians at night by creating an immersive and interactive journey for Cadigal Green zebra crossing users while considering key factors such as communication, safety and visibility.

Pathfinder is our solution for improving the overall safety and communications for pedestrians at night. Utilising Xbox Kinect technology, Processing and a projector, our concept effectively creates a path for pedestrians as they cross the zebra crossing, successfully meeting our rationale. In conjunction with this, the addition of LED light strips on the sides of our crossing improves the communication between drivers and pedestrians.

OUR TEAM

Rachel Ryoo

Programmer & Evaluator

Rachel is responsible for helping the programmer and research for arduino. Rachel will also come up with alternative ideas when team faces difficulties during the process. She will take part of the testing and evaluating for the outcomes of interfaces and building the crossing platform.

James Lee

Researcher & Planner

James is responsible for the platform of the crossing including the wiring of the pressure sensors within. James will also help with the research for arduino and also help the team in coming up with alternative ideas when faced difficult situations while making sure the process is realistic and doable.

Selena Ung

Evaluator & Organiser

Selena has an important role of being responsible in testing and evaluating the outcome of each interface whether it is successful or needs more improvements. Selena will document these process making sure that the team face less errors during the iteration process.

Maysa Wozeer

Main Programmer & Craftsman

Maysa is responsible for developing a product that is functional and what the team has envisioned. Maysa will research for arduino as she is will be the main programmer and be the craftsman of the team, making the concept an actual product.

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MY ROLE ON THE TEAM.

My role on the team during the research, low and mid fidelity prototyping stages was the evaluator and the organiser. Throughout the entire design process, i was responsible for organising the team, whether this was organising construction plans or deadlines for responsibilities.

My role as the evaluator required me to evaluate our prototypes during each of our stages, “stepping back” and considering the positive and negatives of our prototypes. I also assisted during the evaluating stages, utilising multiple methods to evaluate the feedback we received from our user testing stages.

Some other roles that i took charge of included the background research, the Starry Night concept, initial LED light strip coding and the construction of our projector mount. These will be explored thoroughly in the “contributions” slides.

Overall, our team effectively split the roles on our team according to our strengths and weaknesses, which helped our team dynamic. As a member of the team, I felt that our group worked extremely well together, assisting each other when problems arised. The independent nature of this unit challenged us as a team to challenge ourselves and overcome problems.

LOW AND MID FIDELITY PROTOTYPE

CONTRIBUTIONS.

During our background research stage, each team member conducted their own independent research, eventually coming together to synthesise our findings. Something i specifically looked into was existing products, in which i researched Smart Crossings in London. Following this, we each took responsibility of one concept idea to further research and iterate on, in which i was responsible for Starry Night.

During our low fidelity prototyping stage i was responsible for creating one of our Starry Night initial concept, using paint, cardboard and string to create this. I had three components to my prototype which were the floor, the comet trails and star trails, which were required to be moved as users interacted with our prototype.

In both prototyping stages, the entire team took turns conducting each of our user testing methods which were A/B testing, think aloud method, contextual observation and semi-structured interviews. Following this, we conducted evaluation methods together which included affinity diagramming, heuristic evaluation and decision matrices.

During the construction of our high fidelity prototype, i assisted during the planning stages of our prototype. This included figuring out the logistical issues of the construction of our prototype, for example how we would project on the ground (this will be thoroughly explored in the next slide, called the projector mount.

Following the creation of our plan, i assisted in researching codes that we could utilise and modify for our projected interaction. I also helped in ordered some parts for our projects, such as our LED strip lights.

One responsibility i was tasked with was constructing and creating the code of our LED strip lights, which was required to change colours from red to green according to motion detected. I was able to successfully create this code, however i wasn't able to connect these two codes together.

For our report, our team distributed the responsibilities evenly, in which i was responsible for completing the core functionality and future iterations slides.

HIGH FIDELITY PROTOTYPE

CONTRIBUTIONS.

HIGH FIDELITY PROTOTYPE: THE PROJECTOR MOUNT

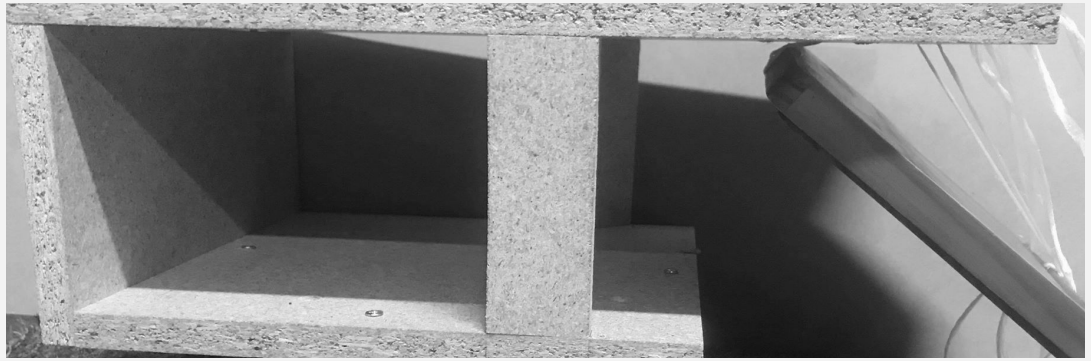
CONTRIBUTIONS.

One of my main contributions was creating our projector mount which required us to construct a mount for the roof in order for the projection to be pointed towards the ground.

To create the mount, we first measured the dimensions of the roof and our projector in order to create a rough design. Following this, we received help from the staff at DMAF and create our mount with plywood.

One problem we faced was how we would attach the mirror in a way that would perfectly reflect the projector image. To tackle this, we attached to lengths of string on both horizontal sides or the mirror and attached this to the mount. This would allow us to easily adjust the mirror angle by tightening or loosening the string attached.

We also faced issues with the legs of our mount which were incorrectly measured during our first construction. However after re-measuring the dimensions we were able to successfully mount it on the roof.



During our low fidelity prototyping stages, we didn't encounter many problems as our tasks were quite simple and easy to complete.

User testing 10 people for our low fidelity prototype was quite a task however as it was extremely tedious and time consuming. To make this process faster we had one or two people on either of our three prototypes and had a "conveyor" system.

During our evaluation stages we had trouble with finding adequate time to meet in order to evaluate our user testing results. To tackle this, we organised a short time at university to meet and then finished these evaluation via online methods eg. Facebook calls and Google slides/docs.

Overall, this early stage of our prototype meant that we didn't encounter many problems as it was only a very early iterative stage. This early stage also revealed that our team worked extremely well together, each being responsible for one task and then swapping these to be fair on all our team members.

LOW FIDELITY PROTOTYPE

CHALLENGES.

During our mid-fidelity prototyping stage, we constructed our prototypes by creating simulation walkthroughs with After Effects and a projector.

Prior to user testing, we did faced issues finding a suitable spot to test our concepts as there weren't many rooms that were empty or dark enough for us to user test. However, we eventually found a room that was dark enough for us to user test.

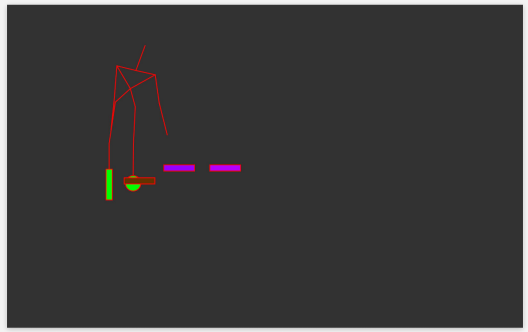
Another issue we faced was how to project onto the ground. Our team didn't know what angle or height would be the most effective to project our animation on. However after testing multiple heights and angles, we eventually found one that we were happy with.

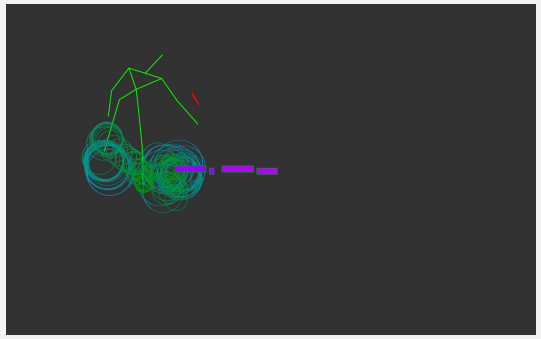
Due to the nature of projecting on the ground, there were issues with the distortion of the image on the ground. This was easily solved by using the keystone feature on the projector.

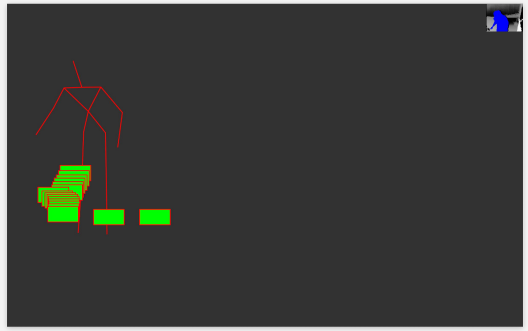
Overall, during this stage of our project our team worked extremely well together as we allocated tasks and completed these to the best of our ability.

MID FIDELITY PROTOTYPE

CHALLENGES.







Iterations of our Kinect

During the construction of our high fidelity prototype we faced many issues which included:

1. Kinect: We faced numerous issues with our Kinect as we encountered problems with the skeletal tracking and foot tracking as the Kinect wasn't able to track certain movements.
2. Arduino: The logistical nature of our LED strips resulted in us encountering numerous problems such as a delay between the sensors and our LED light strips.
3. Platform: Due to hardware that we needed to hide, we originally wanted to create a wooden platform however due to logistical issues and costs this posed as a problem.

To solve the issue of our Kinect we discovered it was not possible to achieve what we wanted to using the kinect. Therefore we decided to alter the concept slightly to have *only* the path in front of the user that disappeared when they walked over their path.

For our Arduino it was only a matter of continued testing and asking around for help. The sensors also required screwing for delay and sensitivity, which had to be done manually. The range of detection for motion sensors were 110 degrees, which we had to place carefully considering this range.

Knowing there were too many reasons going against a platform we had to go back to basic and think outside the box a little bit to consider how we could hide the components. We realised some tape and setting up the surrounding scene would be able to hide our wiring successfully.

HIGH FIDELITY PROTOTYPE

CHALLENGES.

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FINAL REFLECTION.

Overall, our team worked extremely well together as we each utilised our strengths and weaknesses to our advantages. Whilst we did encounter problems, our team was able to work through these problems together. If our team were to do things differently they would be:

INTERACTIVE FLOOR

Our interactive floor had numerous issues, thus we would improve our code by making it interactive both directions of the crossing and letting multiple users interact on it.

ORGANISATION

Whilst we were able to complete our project on time, our team felt that we could've organised our time better which may have improved our overall finished prototype.

LED LIGHT STRIP

Given the opportunity, we would improve the coding of our LED light strips, making dashes in the LED light strip and ensuring the code works in sync with our interactive floor.

Our team will continue to prototype this project further for the design graduation show. We will fix the following issues explored above to ensure that the quality of our high fidelity prototype will be the highest.