Assessment 1 Concept Proposal and Pitch

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Project Brief

In a modern social environment, everyone can choose different means of transportation to get to their destination. Regardless of which of these modes of travel, people are required to look at the traffic lights and obey the traffic rules. After all, this will ensure the safety of themselves and others. But many times pedestrians will feel that the long waiting time is very boring.

Today, we will apply smart technology to urban areas to improve people's quality of life. We will use projection interaction technology to put our design products on the ground to reduce the boring feeling of pedestrians waiting for the red light at night and increase their experience in the waiting area, which can guide pedestrians to wait for the red light at night to ensure their safety and also to improve the pedestrian experience of the city.

Background Research -Cindy

Road traffic crashes at night

- Road traffic crashes are main cause of death and injury, especially in developing countries.
- It is estimated that road traffic injuries will become third world disease burden rankings by 2020, and 2.3 million people died per year in globally.
- Street lighting and traffic light has been suggested as a relatively low-cost intervention with the potential to prevent traffic crashes.
- According to Fiona R Beyer and Katharine Ker's research, the result shows street lighting and traffic light may improve a driver's visual capabilities and ability to detect roadway hazards.
- Street lighting and traffic light may also have an bad influence on road safety, driver may feel safer as street lighting and traffic gives them better visibility which could allow them increasing speed and reducing concentration. (Fiona R Beyer, Katharine Ker 2009)

TABLE 13. SEVERITY OF ACCIDENTS DURING VARIOUS LIGHT CONDITIONS (URBAN ROADS)

LIGHT CONDITIONS	PERCENT INJURY ACCIDENTS	PERCENT FATAL ACCIDENTS
Daylight	9.7	0.14
Dawn	9.4	0.67
Dusk	11.6	0.22
Darkness	14.4	0.53

(Transportation Kentucky Transportation Center Research Report Traffic Accidents: Day Versus Night By Donald R. Herd, Kenneth R. Agent, Rolands L. Rizenbergs Table 13)

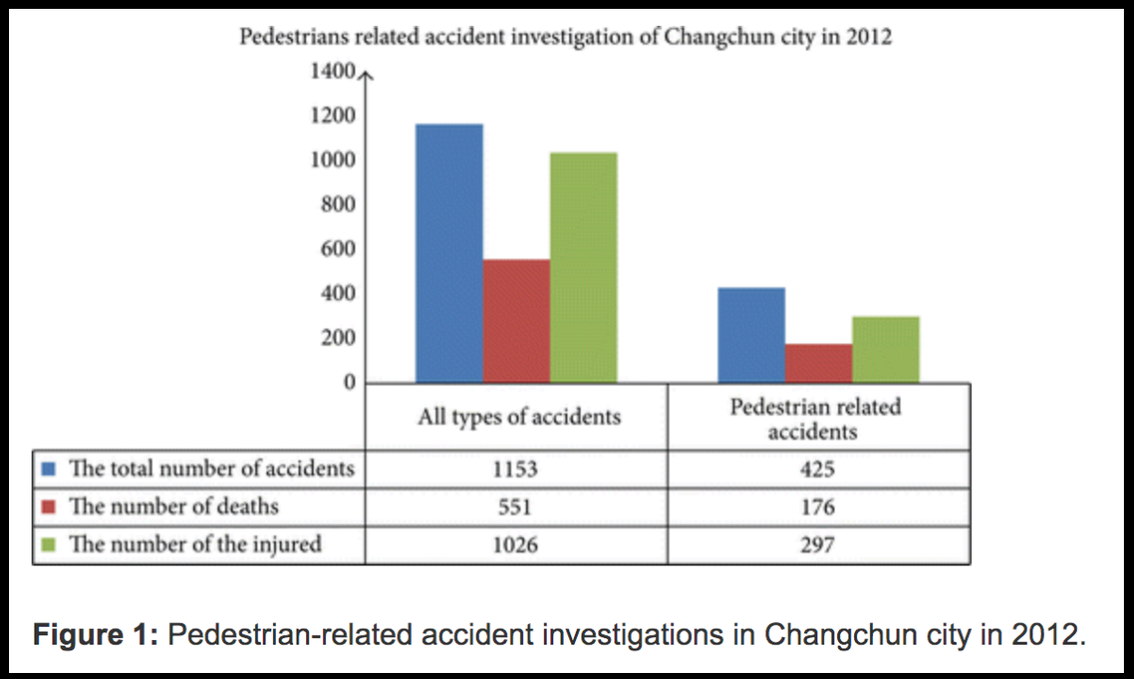
- According to the table above, the rate of road traffic injured was found to increase during the nighttime.
- The percentage of fatal accidents during nighttime was nearly four times compare to the daytime. As accidents are likely to occur when the driver don't have enough sleep or is driving during their normal hours of sleep.
- Drivers are four times more likely to have a fatal crash caused by fatigue; Fatigue can influence a driver's judgement and performance, as well as reduce their attention and concentration.

Background Research -Bai

Unsafe behaviour

Pedestrians are the most serious victims of traffic accidents and one of the weaker groups in traffic accidents. Their unsafe behaviour is an important factor in traffic accidents. According to statistics, pedestrian-related accidents directly account for about one-third of the total number of road traffic accidents in China. The number of pedestrian deaths in traffic accidents accounted for 27% of the total number of traffic accident deaths (Ding et al., 2014). Pedestrians' perception of the road environment is perceptual. Cognitive psychologists believe that the three stages (perception-judgment-response) constitute the human information processing system. Because pedestrians have limited knowledge of outside information, any phase error can cause pedestrians to exhibit unsafe behaviour when crossing the road (Ding et al., 2014).Therefore, there are two main reasons.

- For the lack of awareness of traffic risks, pedestrians first psychologically judge the degree of risk of the street before crossing the road. The main reasons for their judgment include comfort, safety, convenience and reliability. Pedestrians choose their own acceptable level of risk when crossing the road. If the risk is beyond their own tolerance, they will choose to wait.
- For waiting times beyond the threshold of pedestrians, at some large intersections, pedestrian red-light time is found to be more than 100 seconds, which far exceeds the psychologically affordable time of pedestrians. The long waiting time caused pedestrians to lose patience and illegally cross the road.



	All types of accidents	Pedestrian related accidents
The total number of accidents	1153	425
The number of deaths	551	176
The number of the injured	1026	297

Figure 1: Pedestrian-related accident investigations in Changchun city in 2012.

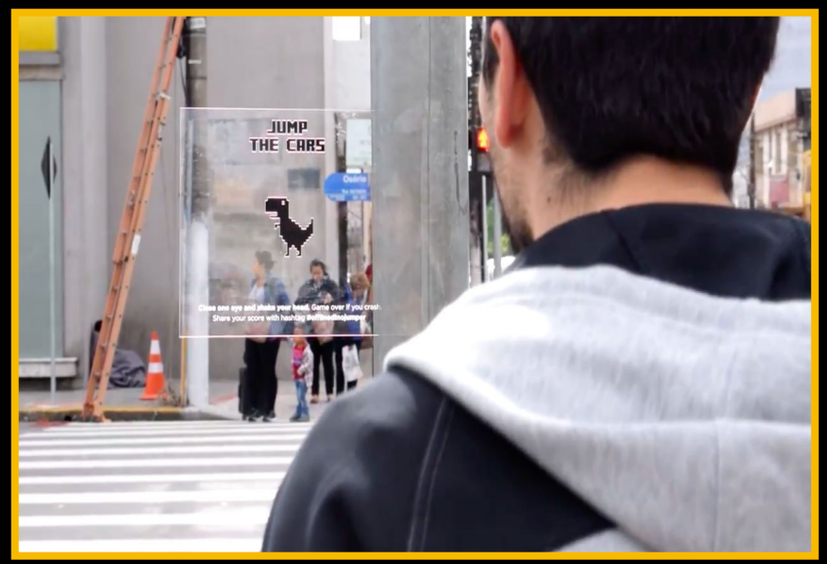
Attention

Attention can be stimulated by stimulating attributes.

- We find ourselves being attracted to “eccentric” stimuli that are very different from the background or stimulated by some sensory features (such as colour) that are different from the one we are looking for.
- At the same time, regardless of the ongoing task, potentially important sensory stimuli, such as loud alarms or sudden movements, will draw our attention. When we detect stimuli that may be of a behavioural importance, we will appreciate our attention.

Market Analysis - Yan

Offline Dino Jumper: Jump the Cars



Jump the Cars is a simple creative game of the Brazilian creative team. The creative team put a transparent plastic plate with a dinosaur pattern on the pillars of the traffic lights. Pedestrians crossing the road can shake the head up and down to let the dinosaurs jump over the cars on the road.

Advantage:

1. This idea can make pedestrians more fun when they wait for the traffic lights.
2. It can also reduce the probability of jaywalking.

Disadvantages:

1. This idea lacks interactivity because it requires pedestrians to shake the head to participate in the game.
2. The game has no result, which will make pedestrians feel tired and bored.

Market Analysis - Shirley

WOW! NINJA in SHIBUYA

At the end of 2018, Japan created a daily animated ninja show on the Shibuya MODI building's outdoor screen. The short film will be played when the red light is on. The content of the film is the image of a traditional Japanese ninja. In the video designed for the night, the red light is vividly integrated into the film, attracting many visitors waiting for the traffic lights to stop and watch. The short film promoted the DOCOMO tourism information portal very well, and also promoted the history, culture and sightseeing atmosphere of Japan, which triggered the curiosity of visitors and reduced people's anxiety while waiting for the red light.

But in terms of interaction, they have shortcomings, this product does not have actual interaction with pedestrians.

Photo Credit: docomoOfficial

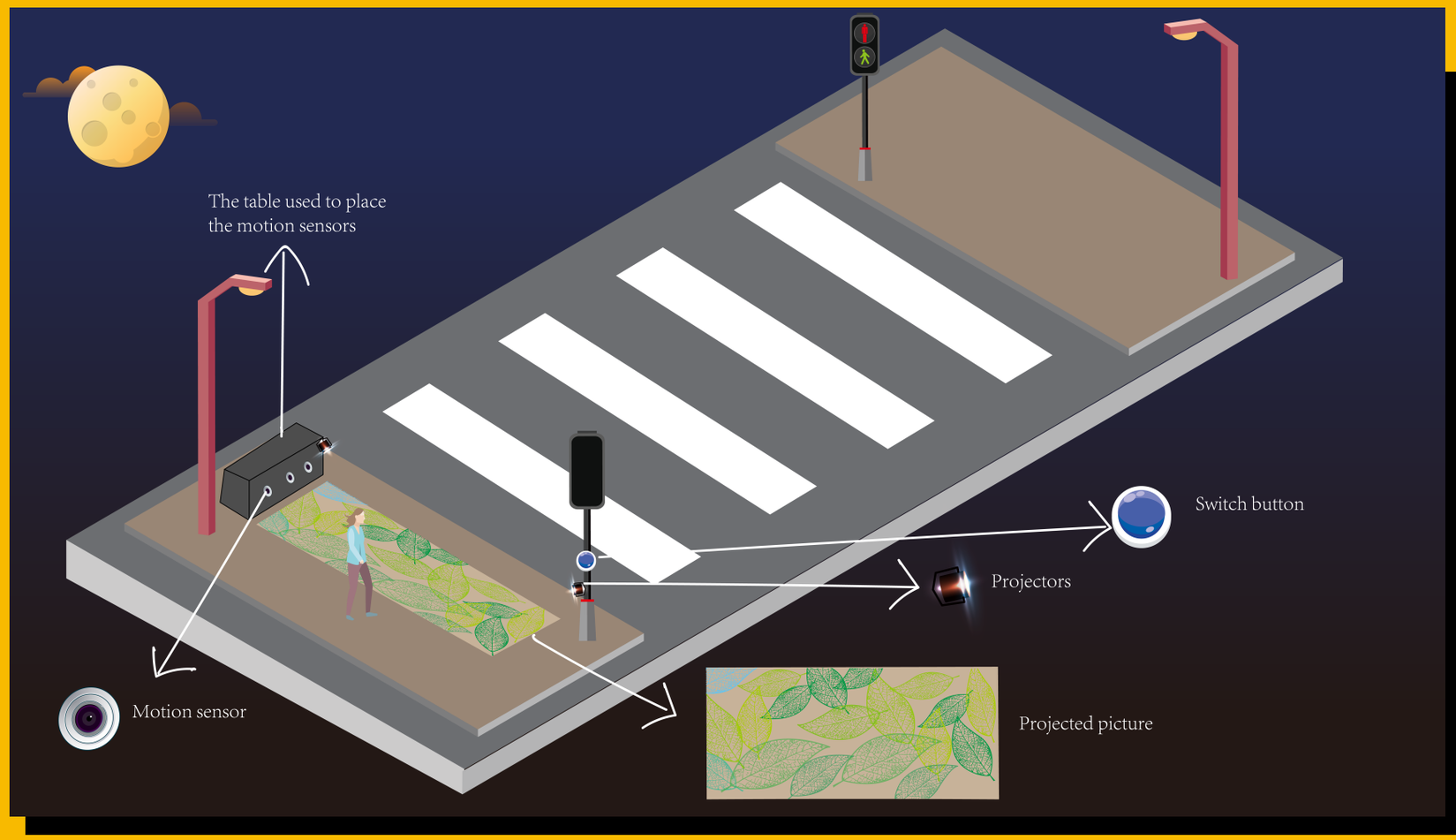
Summary

In summarise, road traffic injured are more likely occurred during nighttime due to drivers' ability to avoid collisions will be influence under dim lighting. Pedestrian are unlikely wait for traffic light due to the waiting time are exceeding their psychological expectation. Encourage pedestrians waiting for the traffic light can effectively reduce road traffic injuries. The research demonstrates colours that are different from the big environment or sudden changes can attract pedestrians' attention.

Through our market analyses, we found that these ideas have no actual interaction with pedestrians, so it can't increase the fun for pedestrians when they wait the traffic light. So our products need to increase interaction with pedestrians so that pedestrians can feel fresh and make the waiting time more interesting.

Blooming Flower Projection - Bai

Concept 1



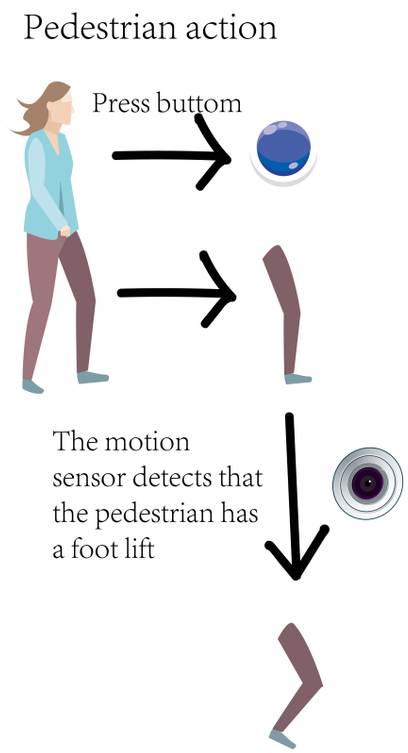
Scene of using the device
- Sidewalk waiting area at night

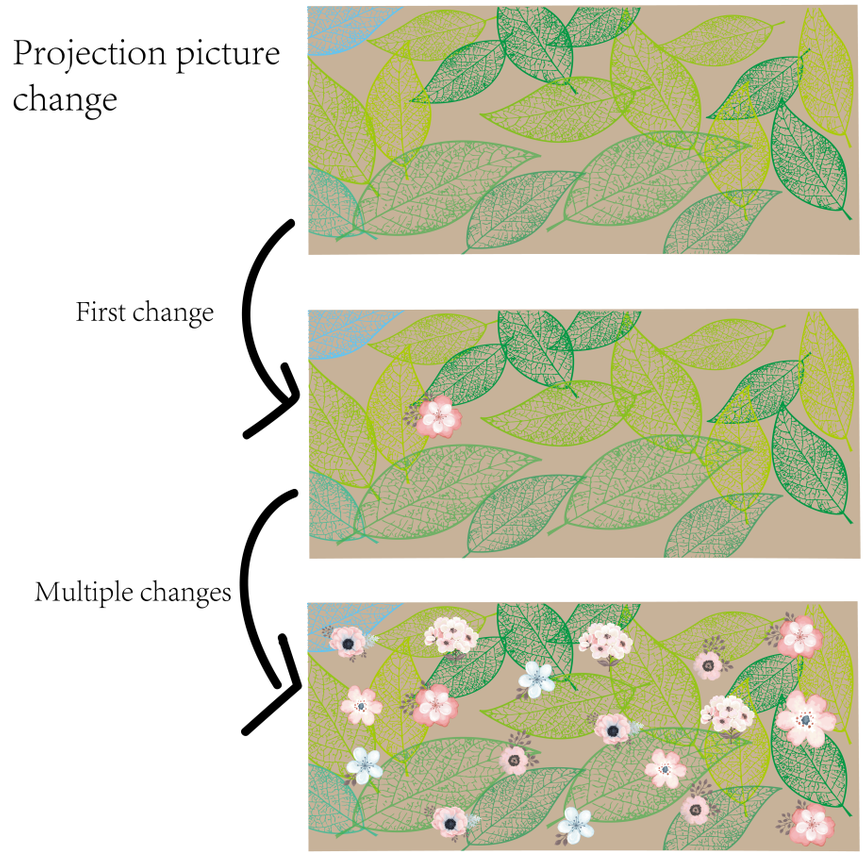
Target population
- Pedestrians crossing the road at night

This facility consists of four main components
- Motion sensors
- Projections
- Tables for placing projections
- Switch buttons

Blooming Flower Projection - Bai

Concept 1





Steps for usage

1. The green light is on and the pedestrian needs to press the button
2. The pedestrian has the action of lifting the foot forward
3. The pedestrian keeps watching
4. The green light is on and the pedestrian pass the road

Changes in the projected image

1. Projection screen appears on the ground
2. The flowers will bloom on the green leaves
3. The final picture will become a flowery picture
4. The flowers will disappear and the projection will close

Blooming Flower Projection - Bai

Concept 1

Comparison with other products on the market

According to market analysis, I found that (WOW! NINJIA in SHIBUTA) this product has a better visual experience but lacks interactivity. Pedestrians are more likely to look at rather than participate. My flower projections can detect people's movements to make changes, people have more sense of participation, and flower projections are more attractive.

My product advantages

1. Easy to use
2. Interact with pedestrians
3. A good visual experience can attract the attention of pedestrians
4. Increasing their psychological time threshold and reducing their boredom

My product disadvantages

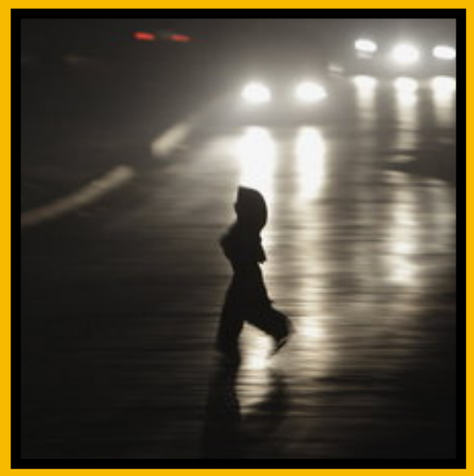
1. The sensor may not recognise the actions of multiple pedestrians
2. Projection screens may overlap because there is a projector on each side
3. Projection time cannot be synchronised with traffic light time
4. Projection does not open automatically

Virtual scatter petal game - Cindy

Concept 2

Scene of using the device
- Sidewalk waiting area at night

Target population
- Pedestrians crossing the road at night



Design problem

According to our background research, the rate of road traffic injuries caused by pedestrians crossing the road at nighttime is **4** times higher compare to the day time, especially between 10pm till dawn. As at nighttime there are less car compare to daytime so **pedestrians think is safe to crosses the road and ignore the traffic light.**

How would it solve the problem?

This virtual scatter petal game is designed to encourage pedestrians to wait for traffic lights at night instead of crossing the road. Our design idea is to create a virtual interactive game of in the waiting area. The game can attract pedestrians' attention, motivating them to wait for traffic lights at night instead of crossing the road.

Virtual scatter petal game - Cindy

Virtual scatter petal game

VS

Offline Dino jumper: jump the cars

Advantage

- Novel game with holographic projector and leap motion stimulate pedestrian's curiosity.
- Use holographic projector to deliver a three-dimensional flower patter makes the flower looks more realistic.
- Use leap motion allow pedestrians to pick petals with their hands and fingers as input, but requires no hand contact or touching.
- Interactive game, motivating pedestrians to play game wait for traffic light instead of crossing road and make them feel less bored.

Limitation

- Only one person can play at a time, user may feel been isolated
- May cause crowd gathering and traffic congestion
- Components require high cost, and has risk to be stolen by others.

Advantage

- Requires no network
- Low cost
- Can reduce bored feel

Limitation

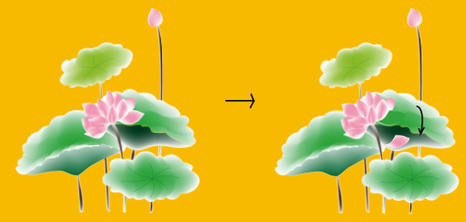
- Less interactive
- Requires user to shake the head to participate in the game and record the score by themselves user may feels boring.

Concept 2

Virtual scatter petal game - Cindy

Concept 2

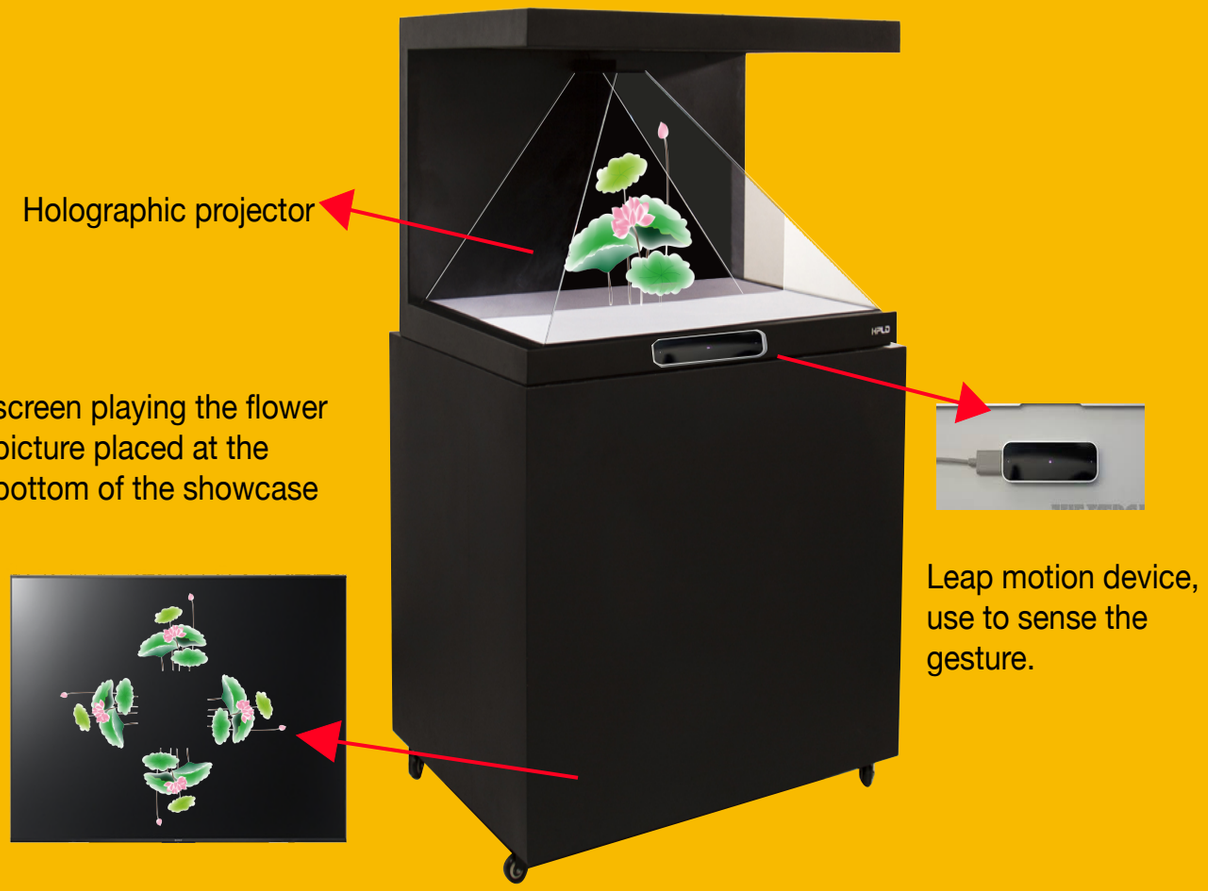
The petal will fall down after the user gesture.



How does it work?

- when traffic light turns red, the screen will be switch on.
- Start showing flower pattern on the screen.
- The holographic projector will project a three-dimensional flower
- The petals begin to fall when leap motion sensor identify user's gesture
- The screen will be switch off when traffic light turns red.

By doing scatter petal's hand poses to scatter petal from the flower.



Structure

- presented in the form of a rectangular showcase
- Screen placed at the base of showcase
- Holographic projector placed at the top of showcase
- Leap motion sensor to the screen, and placed at outside of the holographic projector

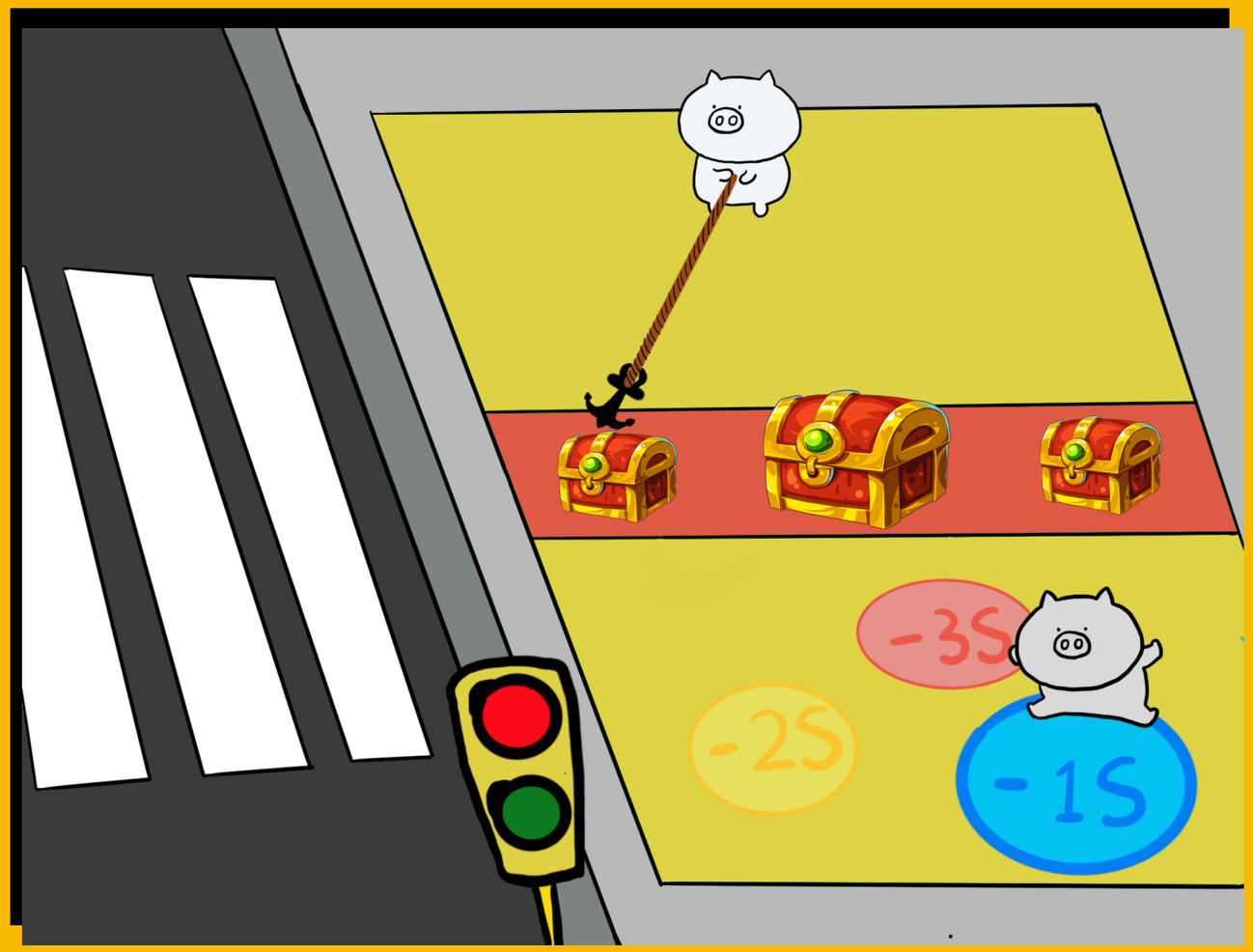
This facility consists of four main components

- Holographic projector
- Screen
- Rectangle showcase
- computer hardware sensor device

Jump for the less red-light time - Shirley

3

Concept



How would it work?

When people wait for the red light, in the waiting area on the side of the zebra crossing, there will be a treasure hunt match game projected on the ground. This is a two-player game. When people stand in the left and right areas, the game will start automatically.

There are two playing areas in the waiting area. Under the projector's projection, User A in the left area can see the circle “-1s”,”-2s”,”-3s” that reduces the red-light time. User A jumps twice in the circle with both feet that can dig out the time-reducing items. After the item is dug, the item will move to the common area in the middle.

User B in the right area can adjust the direction of the rope's launch with the angle of the feet. Jump twice to launch the rope and collect the treasure in the middle area to reduce the red-light time.

Jump for the less red-light time - Shirley

How would it solve the problem?

Through the interaction between the two people, this game can bring people closer together, what's more, it could attract the attention of pedestrians and reduce the chance of jaywalking, then reduce the anxiety of pedestrians when waiting for the red light.

How does it compare to other solutions already on the market?

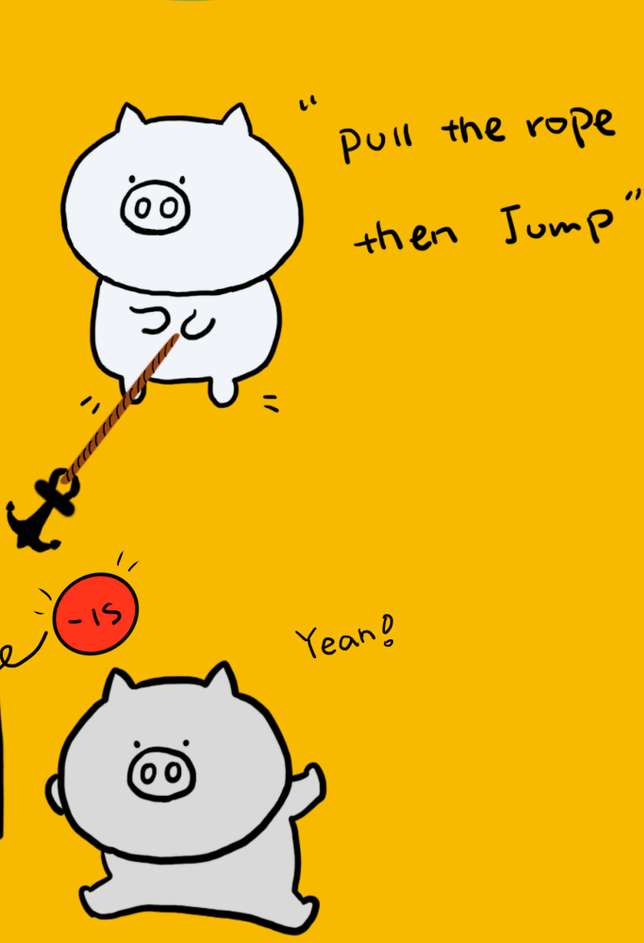
Compared with other games, this concept has stronger user experience and is a two-player game that adds and interacts. The combination of light and shadow effects allows pedestrians to forget the anxiety of waiting for the red light.

Concept

3

Weaknesses

- This game is only suitable for two people, the actual intersection, pedestrians will generally more than two.
- It is also a problem that many feet are stepping on the screen at the same time. The product is not suitable for a crowded waiting area.
- In the game, reducing the red light time is not easy to achieve in reality.



Hardware & Software Requirements

Blooming flower projection (Ziqi Bai)

Software:

The design will run on Windows and projector

We will need Adobe Suite, atom and Processing as software

The programming language we will use P5JS, C++

Hardware:

In this design, we used the motion sensor, projection and Bluetooth. The motion sensor is used to track the user's movements, then the data is transmitted via Bluetooth, and the motherboard is connected to Bluetooth and a computer. The projection will put the design to the ground

Virtual scatter petal game (Cindy)

Software:

The design will run on Windows and leap motion

We will need Adobe Suite

The programming language we will use C++

Hardware:

In this design, we used leap motion, holographic projection, Bluetooth and mainboard. We use the leap motion to identify the user's gestures and the data is transmitted using Bluetooth. The motherboard is connected to Bluetooth. The holographic projection will project something of the design

Title: Jump for the less red-light time(Shirley)

Software:

The design will run on Windows and projector

We will need Adobe Suite

The programming language we will use Java

Hardware:

In this design, we used the motion sensor, projection and Bluetooth. The motion sensor is used to track the user's movements, then the data is transmitted via Bluetooth, and the motherboard is connected to Bluetooth and a computer. The projection will put the design to the ground

Group Charter

Yan Jiang	Leader and programmer, manage the think process.
Ziqi Bai	Designer and programmer, focuses on creativity; the possibilities, alternatives, and new ideas.
Cindy	Designer and programmer, focuses on creativity; the possibilities, alternatives, and new ideas
Shiting Li	Ideation and programmer, focuses on creativity; the possibilities, alternatives, and new ideas.

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