



Assessment 3 Portfolio

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Steam: B
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Introduction



Problem statement

The problem we solved was that pedestrians crossed the road illegally at night. The main reason for pedestrians crossing the road illegally is that pedestrians feel that waiting time is beyond their threshold, and the long waiting time far exceeds the psychological capacity of pedestrians. To solve this problem and encourage pedestrians to wait for the red light, we use projection interaction technology to reduce the boredom of pedestrians waiting for the red light at night and increase their experience in the waiting area.

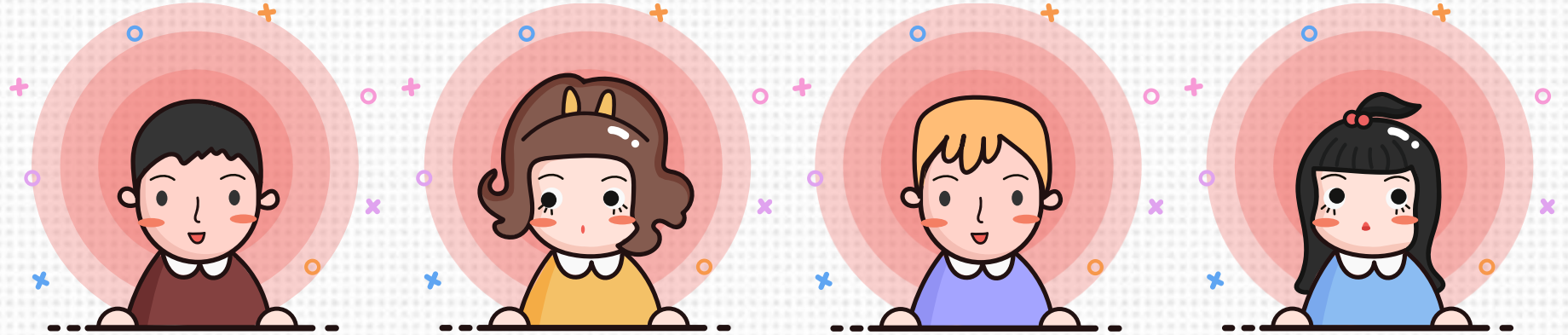


Description of the final concept

We designed a projection interactive game for pedestrians waiting for the red light at night. This game reduces the boredom of pedestrians waiting for a red light by encouraging pedestrians to press the button to explode the balloon in the projection. This game combines Arduino UNO r3, computer, buttons and projection to create a realistic interactive scene.

Team Structure

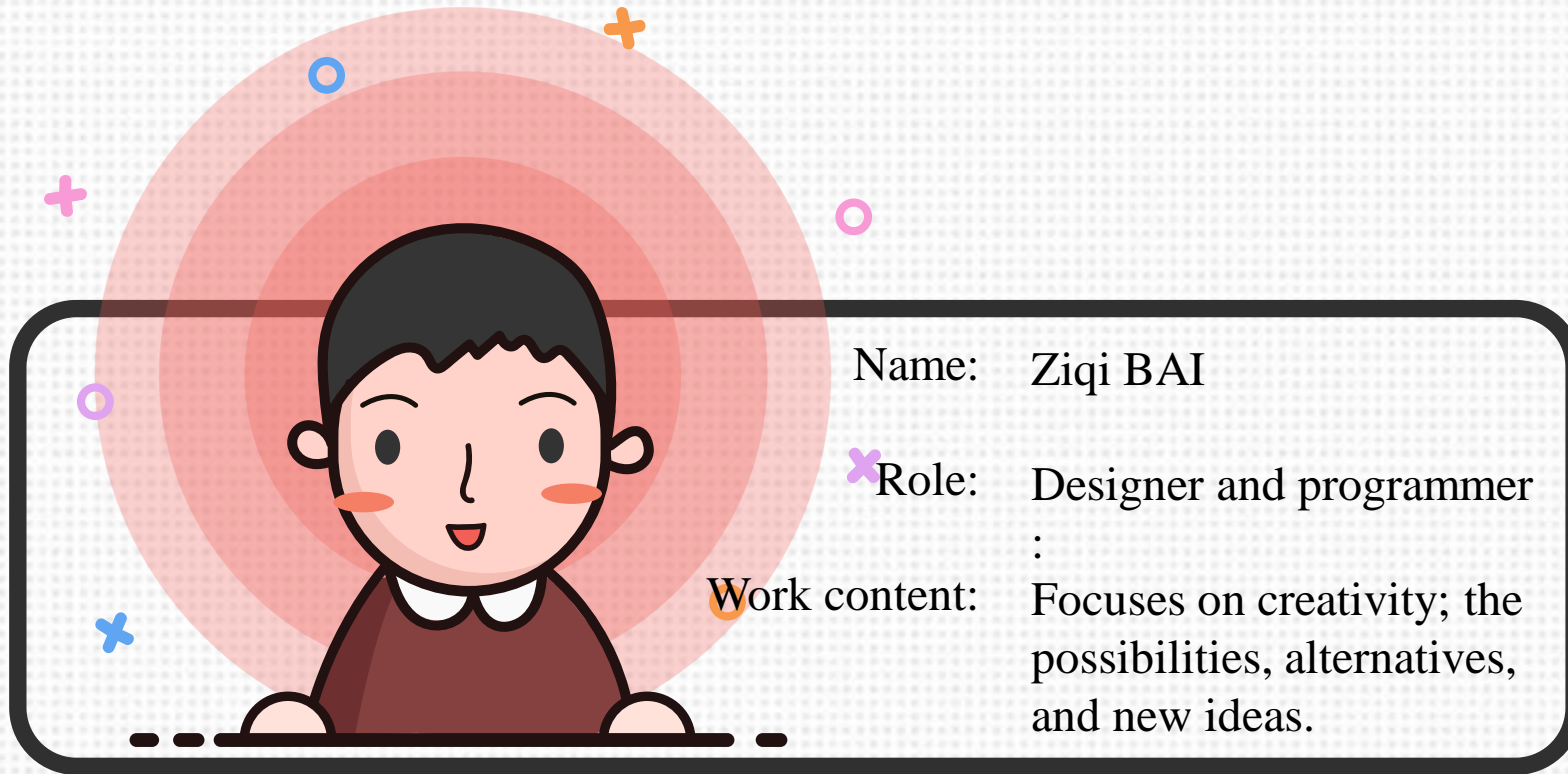
Team members



| | | | | |
|--------------|--|--|--------------------------|---|
| Name | Ziqi BAi | Shiting LI | Yan JIANG | Cindy |
| Role | Designer and programmer | Ideation and programmer | Leader and programmer | Designer and programmer |
| Work content | Focuses on creativity; the possibilities, alternatives, and new ideas. | Focuses on creativity; the possibilities, alternatives, and new ideas. | Manage the think process | Focuses on creativity; the possibilities, alternatives, and new ideas |

Team Structure

My role



Name: Ziqi BAI

Role: Designer and programmer
:

Work content: Focuses on creativity; the possibilities, alternatives, and new ideas.

In the group work, my role is designer and programmer, I mainly complete these parts of the assessment:

Assessment 1

1. Background Study
2. Design a complete concept (including principles, usage, and prototype)

Assessment 2

1. Making a prototype of myself
2. Collection of test data
3. Summary of each round of testing
4. Advice on the final concept

Assessment 3

1. Final product assembly
2. Scene layout
3. Introduction and setup instructions in the Reports
4. Participated in shooting video

Contributions

Assessment 1

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 assessment 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.

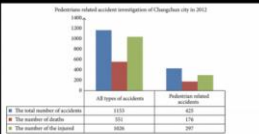


Figure 1: Pedestrian-related accident investigations in Changchun city in 2012.

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.

Background research

In Assessment 1, my main contribution has two aspects:

1. I did some background research and laid the foundation for our concept.
2. I made a complete concept (including principles, required equipment, usage and prototype) and analyzed the pros and cons of this concept.

Blooming Flower Projection - Bai

Concept 1



Scene of using the device

- Sidewalk waiting area at night

Target population

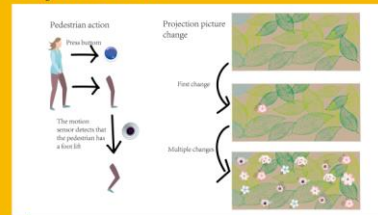
- Pedestrians crossing the road at night

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! NINJA 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

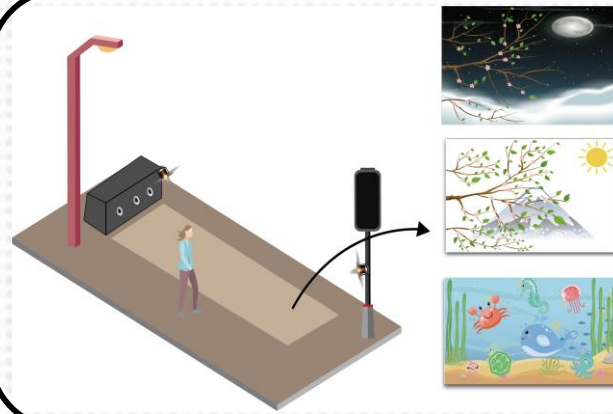
The process of my concept

Contributions

Assessment 2



Test data collection and prototype production



Final proposal for prototype

In Assessment 2, my main contributions have four aspects:

1. I made prototypes for each version of my own program.
2. I collected a portion of the data for each test.
3. I have summarized and analyzed each of the data and provided support for their improvement.
4. Through testing, I provided suggestions for the final plan.

TEST 1 FINDING

In this test, we selected **12 testers**, and we **interviewed and surveyed** them. Based on the results of interviews and questionnaires, we produced **affinity diagrams** on three concepts, and we came to the following conclusions:

Concept 1

Advantages:

- This concept is easy to understand and easy to use.
- This concept is creative and looks great and interesting
- This concept is very attractive
- This concept makes people feel very curious.
- This concept allows people to make more friends.
- This concept has strong interactivity

Disadvantages:

- The projected pattern is not very good.
- Lack of change
- People don't know where to stand to change the picture.
- It don't have the connection to the red-light.

Concept 2

Advantages:

- 3D model is very technical
- Design is very conspicuous and very interactive

Disadvantages:

- Need to support more people
- The concept seems to be costly
- Need more introduction on how to use it
- Lack of change

Concept 3

Advantages:

- Cartoon image is very cute.
- It is a very interesting game
- Increase communication between people

Disadvantages:

- Need at least two people
- It is difficult to use
- Unfriendly for the elderly and disabled
- It is unrealistic to change the time of traffic lights.
- Jumping on the road is not safe

TEST 2 FINDING

In this test, we selected **12 testers**, and we **interviewed and surveyed** them. Based on the results of interviews and questionnaires, we produced **affinity diagrams** on two concepts, and we came to the following conclusions:

Concept 1.1

Advantages:

- This concept is **easy to understand and easy to use**
- This concept is **creative and looks great**
- This concept is **very attractive**

Disadvantages:

- Too simple to make it **lack interactivity**
- **Lack of change**
- **Unable to determine when the green light is on**
- More **safe to use**
- Need to support **more people**

Concept 2.1

Advantages:

- 3D model is very **technical**
- The visual effect is very **good**
- The second concept is **more interactive**
- This concept is very **attractive**
- It's incredible when it's in **reality**

Disadvantages:

- It is **easily damaged** on the roadside
- The device is too **big**
- Should **not be able to use it with friends**
- **Lack of change**
- It can **prompt people** that the green time is coming.
- **Not easy to use**
- The device is very **expensive**

TEST 3 FINDING

In this test, we used **analyse method-focus group**. We selected **8 testers** to make a group, and we interviewed them. Based on the results of focus group, we produced **affinity diagrams** on last one concepts, and we came to the following conclusions:

Concept 1.2

Advantages:

- This concept is very **interesting**
- The process of growing leaves and flowers is **so more**
- Make the waiting area is very **conspicuous and beautiful**
- The background is very **beautiful**
- **Reduce boredom**

Concept 1.2

Disadvantages:

- Need more **topics**
- Play more, will still feel **bored**
- Have **more themes** showing randomly

After **three rounds** of testing, we will analyze the collected data to obtain effective user needs and market demand. Finally, we will maintain the original advantages, and then improve the proposed deficiencies, complete the final design - concept 1.3.

Three rounds of testing's findings

Contributions

Assessment 3



Final
product
assembly
and scene
layout

In Assessment 3, my main contributions have four aspects:

1. I made a part of the High fidelity prototype and assembled them.
2. I was involved in making the scene simulation, we simulated the waiting area at night.
3. I completed the Introduction and setup instructions in the final report.
4. Participated in shooting video

Introduction

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. 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 driving information, only physical cues control pedestrians to exhibit unsafe behaviour when crossing the road. (Ding et al., 2014).

Therefore, 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.

So we created the "Press to boom!" button game to attract the attention of the pedestrians and reduce the probability that they would illegally cross the road.

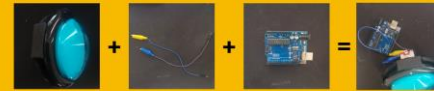
Introduction

Buttons are a reward system. When we push a button, we expect something to happen - and usually, it's not a bad thing. Look at the ever-addicting text message: we essentially have to push (or swipe) a button to get the message. Like a rat in a lab tapping a pedal that makes food drop into the cage(Hill, 2016).



So we designed this button game to attract attention and reduce the probability that they would cross the road illegally. This device can increase the safety of pedestrians crossing the road.

Illustrated setup instructions



We made physical buttons using buttons, cables and UNO R3 board. Pressing the button will transfer the message to the UNO R3 board.

Illustrated setup instructions



With processing, each press of the button changes the picture on the computer. Our picture is from a small balloon to the final explosion. At the same time, the picture on the computer is transmitted to the projector through the same screen. Finally, use projection to show the changes in the picture.

The
parts
of
report

Challenges

Assessment 1

Problems

In background research, we cannot find enough theory to support the problems we are studying

In market analysis, we can't find similar products to compare

In the concepts, the concept we originally thought of is not good enough.

Solutions

For background research, we looked for more information and thought about it from multiple perspectives. (like the reason for illegal crossing the road and what attracts attention)

For market analysis, we choose not to focus on the waiting area, but to choose products with the same principle. (like interactive projection)

For concepts, each of us has produced multiple original concepts, and then through fusion and selection to determine the final concept of each person.

Challenges

Assessment 2

Problems

Selection of research methods and analytical methods

The degree of prototype production

Production of Final concept

Solutions

We finally chose Interviews and Focus group as the research methods and Affinity diagram as the analysis method.

We chose to create a prototype that can be projected in the third round of testing. This prototype has the scene we envisioned, but uses animation instead of programming. Create the best test experience for users.

For concepts, each of us has produced multiple original concepts, and then through fusion and selection to determine the final concept of each person.

Challenges

Assessment 3

Problems

Because our concept has no clear purpose, we temporarily changed the contents of the concept.

We have a lot of difficulties in programming.

The lights make our projections not clear enough

Solutions

We improved the content of the concept at the teacher's suggestion, and we spent some time testing it. We have made sure it is feasible. We spent more time on preparation.

We looked at a lot of tutorials and asked friends who learned programming. Finally, we lowered some of the difficulty and removed the ranking of the game by button time. The programming was finally completed.

We chose to use black cloth to block the sun and the lights, and we adjusted the projector. Then we arranged the scene of the night waiting area in the black cloth to give the tester a more realistic experience.

Final Reflection



How well did you work in your team?

I think my performance on the team is not good enough. Although I completed my own part as required, the completion was not perfect. At the same time, I have not played a big role in both creativity and programming. I can do better.



What could you have done differently?

I am very confident in analyzing the data. I can analyze the data obtained in a structured way to support the improvement of the later works. At the same time, I provided support to the team in terms of hands-on operation. I hope that I can try more programming and provide more good ideas.



Will your team continue to work on the prototype further?

Our team will continue to improve this prototype. The goal is to increase the ranking of the game by button number and enhance the competition between pedestrians. Also, link the device to the traffic light. Make sure the projection and traffic lights are turned on and off at the same time.



END