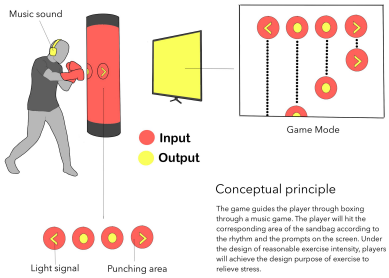
<Music Punching Bag>

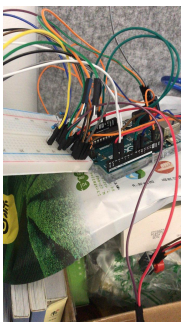
<Help users relieve stress through boxing and music.>

- Concept and problem space

My concept is to design a sandbag that can be hit by users, which can be used according to a music game. When the user hits the sandbags in rhythm, they will get points in the game. The concept helps people exercise through music games, and ultimately achieves the purpose of relieving stress. My target audience is college students who have pressure to relieve. In the following, I will explain the concept and target audience in detail.



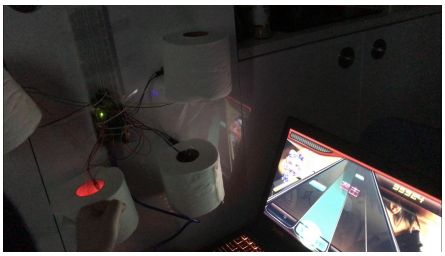
In a mental health survey of 1093 students receiving higher education, it was pointed out that compared with non-students, students are less happy and more anxious. This shows that the young people in higher education should bear more pressure. And these pressures bring more negative effects to students. Research shows that 78% of the respondents have experienced mental health problems in the past year.In a survey of the physical health and lifestyle habits of Native American teenagers, 63% of teenagers are at risk of obesity. After statistics and analysis of teenagers 'behavioral habits, the study found that 59% of teenagers are often sitting state. These teenagers will spend more time watching TV and video games. It can be seen that as a young group, some of the preferences of adolescents are concentrated in entertainment, which may be related to the psychological age or life and learning experience of adolescents, but in general, this preference can become a very special design for the needs of the student group. Important reference.



- Key related work – literature, solutions etc

Gray, A. and Smith, C., 2003. Fitness, dietary intake, and body mass index in urban Native American youth. Journal of the American Dietetic Association, 103(9), pp.1187-1191. https://www.sciencedirect.com/science/article/pii/S0002822303009799?via%3Dihub

Peate, I. (2017). Easing student stress. British Journal Of Nursing, 26(7), 377-377. doi: 10.12968/bjon.2017.26.7.377



- Relationship to team concept/problem

In the team, we first determined our problem area as a solution to the stress problem in the two previous areas. Then we decided to use a problem domain together, using different methods for the same or different user groups. My direction is to help students to release pressure through exercise games.

- Link to video: https://youtu.be/Um6OxiXpJi4

Design Process

The main steps of the design process:

1. Understand the preferences and current situation of the target group

For this young group, it is very important to understand the current psychological and physical health, preferences and behavior habits of this group. In a survey of the physical health and lifestyle habits of Native American teenagers, 63% of teenagers are at risk of obesity. After statistics and analysis of teenagers 'behavioral habits, the study found that 59% of teenagers are often Sitting state. These teenagers will spend more time watching TV and video games. It can be seen that as a young group, some of the preferences of adolescents are concentrated in entertainment, which may be related to the psychological age of young people or life and learning experience, but in general, this preference can be a very important design for the needs of the student group reference.

2. Existing solutions and principles to solve the problem space

In the research on my problem space, that is, stress relief, there are many ways to relieve stress in sports and some physiological proofs are given. First, some elements in video games have been shown to help relieve stress, such as light music, bright and colorful scenes. Second, in the study of the effects of stress on adolescents by Yeats and others, exercise proved to have a positive effect on relieving stress and adjusting the nervous system. Therefore, in my concept, I hope to combine the two elements of music and sports to guide the student group to exercise through video games, and finally achieve the role of physical exercise and stress relief.

3. Evaluation and analysis of existing products

Based on the above conclusions, I analyzed some existing solutions. Regarding whether exercise games can really help users improve their physical conditions in order to achieve the purpose of exercising. In Huang et al.'S experiment on whether exercise video games (EVG) can really improve physical fitness, EVG can replace sports to help users exercise. At the same time, the same conclusion was put forward in the study of cardio fitness experiments by Bock et al. At the same time, I tried some very simple music games, such as "Piano Tiles 2" and "Rhythm Master".

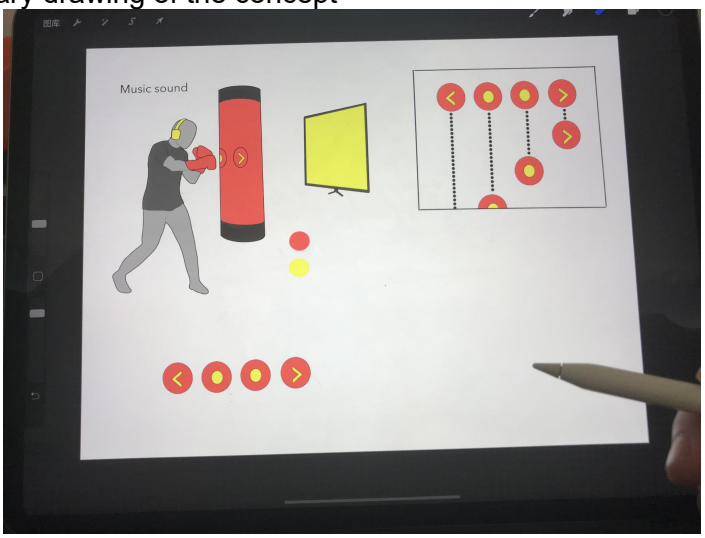
"Piano Tiles 2" game video: https://youtu.be/kVIWzN0DmTc

“Rhythm Master" game video: https://youtu.be/Ue6LwKX8wDY

In contrast, I found that as a game of the same type, Piano Tiles 2 is simpler, and the music adjustment is also very flexible. The difficulty of entry is not high, but Piano Tiles 2 has a more obvious shortcoming that requires the user to control Rhythm, because all the interactive blocks are connected together, the acceptance of changes in the speed of the music is relatively low, so the quality of the music played is somewhat low. The rhythm master pays more attention to rhythm and music effects in the game, and the feedback effect is also better. In order to verify my conclusion, I conducted a simple consultation with more friends who have experience in the two games. As a result, I found a similar conclusion.

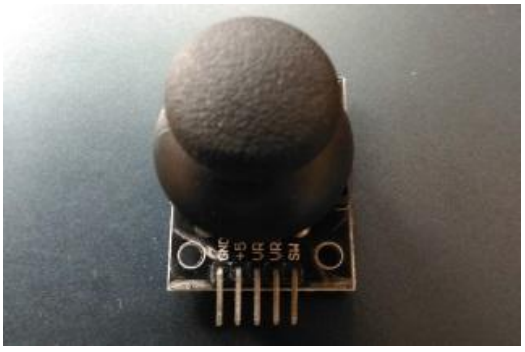
Design Process

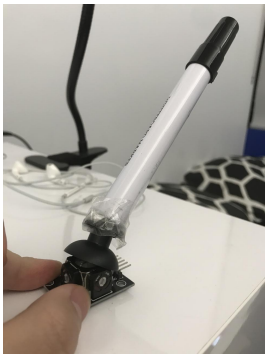
4. Make a preliminary drawing of the concept



5. Prototyping

In the process of making prototypes, how to interact with users has always been a difficult point in my opinion. First of all, the main purpose of my prototype is to help users to exercise, but in fact, most of the sports that can improve physical fitness are relatively violent, and the Arduino components I use are very stable without a more solid way. Fragile, difficult to wear or as part of being hit. Therefore, during the design, I have been thinking about how to restore the most authentic boxing sport.

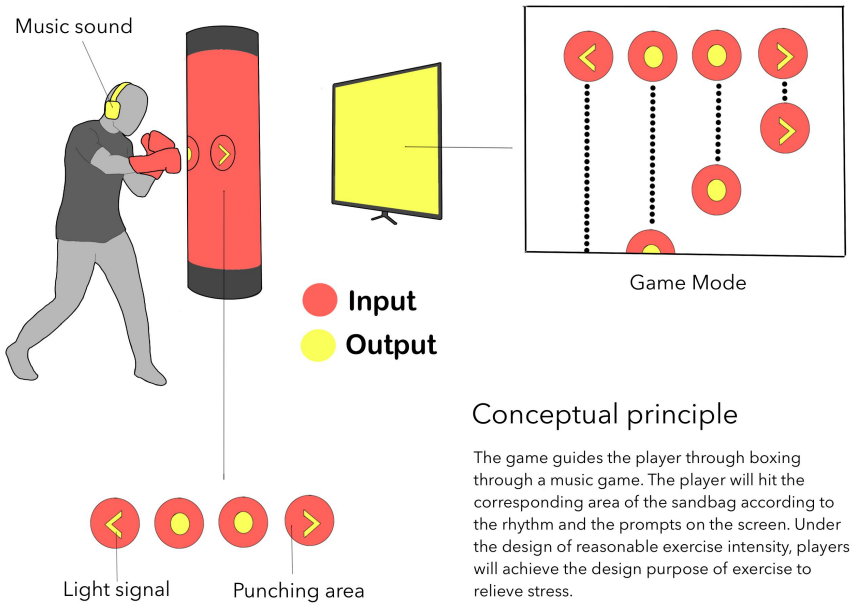




Then I considered whether I could make a tiny prototype and demonstrate my prototype in a miniature scene based on the realization of the function. So I wanted to use a rocker assembly as the base of a "mini" sandbag, so that the sandbag could detect hits from different directions. So I fixed a marker on it as the core of the sandbag, but soon I found the problem. The rocker assembly cannot bear the weight of the marker, and the rocker cannot be restored to its original position during the test. At the same time, I think that even if the joystick can work normally, this miniature prototype can not be used for video demonstration and testing. So I gave up this component.

In the end I chose the button to help me complete this prototype. In fact, in my design, I thought about the possibility of wearing a device. I can design more actions for the wearing device. I put 4 sensors (buttons) at the joints to sense the user's actions, but due to the length of the arduino line Limited, I have no way to achieve this function, so I can only temporarily use it as the sensing area of the sandbag.

Interaction Plan



As shown in the figure, the user needs to wear headphones and stand next to the sandbag, facing the screen (in AR scenes, more visual interaction methods can be considered), and complete the boxing movement according to the rhythm at the prompt of the game.

The output port of the whole concept is that the earphone is used as the output port of music, the screen is used as the output port of the picture (also in the AR scene), and the light feedback of the sensing area.

The user will listen to the music rhythm in the headphones and play the game in combination with the elements of the screen. When the user hits the induction area of the sandbag, the induction area generates light feedback to help the user determine that the impact is effective.

The conceptual input port is the induction zone of the sandbag.

The user can achieve the purpose of exercising in the process of hitting the sandbag. But this port actually has more design potential. For example, the wearable device senses the user's actions to input information. In my initial concept, I was more inclined to wear the device, but due to the limitation of the Arduino's cable length, I was unable to make a full set of wearable devices.

In theory, as a music output port, headphones are not necessary equipment. However, in the design, different usage scenarios are referenced, such as playing games at a later time, and only using external equipment may cause noise pollution to the surrounding people. Therefore, I added headphones to the design. Secondly, in my conceptual diagram, I chose the screen as a means of visual interaction. For music games, I am not sure that music games will be loved by most people, so I will give priority to testing some basic music games, such as "Rhythm Master". I hope to receive more favorable reviews for this type of music game in the test. In the future, I can consider using games with more interactive methods, similar to the VR game "Beat saber". It will also use some virtual scenes for interaction.

Interaction Plan

Finally, I set some lights in the sensing area of the hit. In fact, this light was used to help me determine the circuit used during the prototype test. In the end, I decided to keep this function, because even if the user completed the interactive process with the help of the screen, I still hope that the integrity of the sandbag circuit can be determined during the user's inspection of the sandbag.

My expected interaction process:

1. The user will first try the four sensing areas to confirm that the prototype is working well.

The user may find that the prototype is not working properly, which helps to think about the ability of the prototype in the test in the next stage of making the prototype

2. The user will then open the game to understand the basic rules of the game.

Understanding the basic rules helps users understand how the prototype interacts. During the test, the necessity of the tutorial may be considered.

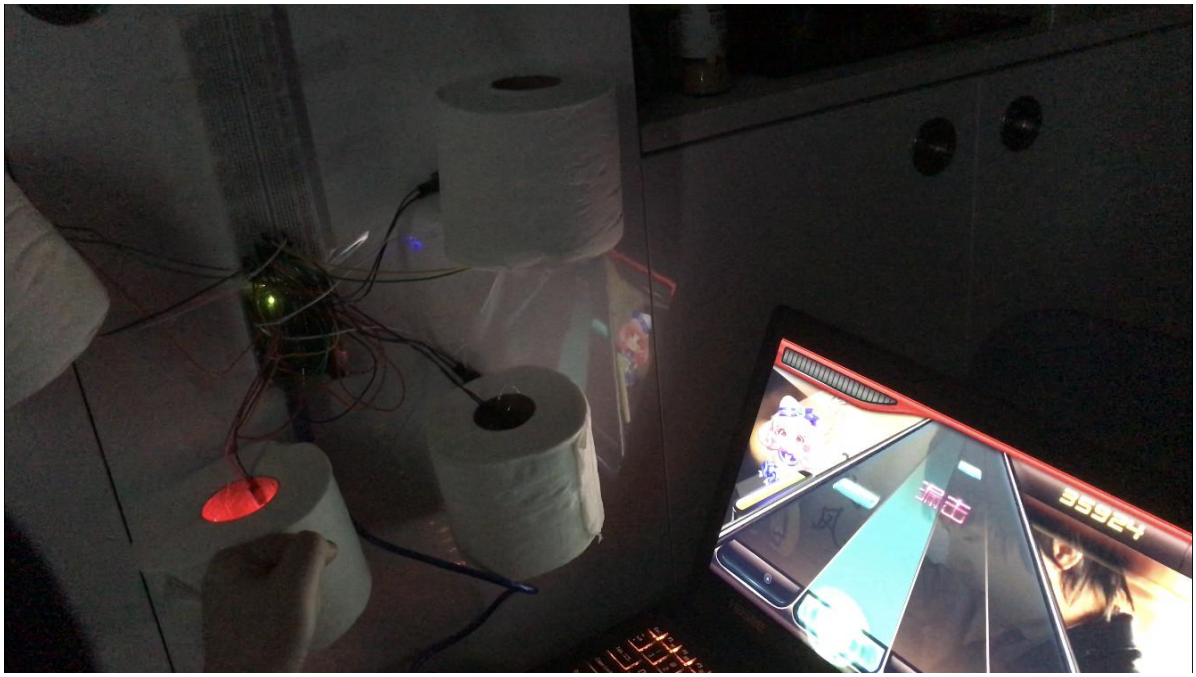
3. The user will then select music for the game.

Users can choose the music that is suitable for venting their stress, in order to fit more people for different types of stress relief.

4. In the game, the user will hit the sandbag to achieve the effect of exercise

Users can choose different difficulty according to their own sports level to achieve different exercise effects.

5. Under the combined effect of exercise and music, users can finally relieve their stress.



Project Objectives and Success Criteria

Project scoring criteria

1. Understand the rules and operation of the game without using tutorials.

For design concepts, it is very important to guide participants through the appearance to understand how to use them. In order to test whether my prototype is easy to understand in terms of appearance, if participants can master all or part of the interaction mode of the prototype without reading the tutorial content, it means that my prototype is not difficult to understand in appearance. At the same time, not using tutorials and understanding how prototypes interact can also help prove the ease of use of prototypes.

2. Get full marks in the game.

Since the core purpose of the concept is to help users relieve stress, for some users, excessive game difficulty may also bring some pressure, so the average score of participants may reflect the difficulty of the game. A simple and fun game can better help users relieve stress. Therefore, whether participants can get full marks in the game is a good way to measure the difficulty of the game.

3. Feel physically tired during the game.

The way to achieve the concept is to exercise. If the user can feel physical fatigue during the game, it can be proved that the user has been physically exercised in the game.

4. Find the participant's favorite music

Everyone may have different music preferences for releasing stress. Therefore, the storage capacity of music needs to be very sufficient. If more participants can find their favorite music in the music library, it proves that the coverage of the music library is comparative. sufficient.