# On the creation of an innovative product:

# RingX

The proposition of the ideal：

Our group believe that an excellent product is supposed to be innovative and practical. To find out the pain spot in our everyday life, we make a brainstorm in the first. The first task for us is to make clear the directions of designing a brand-new product. It can be a ground-breaking appearance design, an improvement to a traditional product, or invent a new category of products. All group members reach a conclusion that whatever product we are going to design, we are supposed to make clear what is the product made for before we begin to gain any improvement.

First, we draw attention to the high damage rate of ofo bikes. It’s very common to see abandoned ofo bikes in the surroundings of Shahe subway station. most bikes’ mechanical structure remain in good condition, the main cause of high damage rate is the man-made destroy to the QR codes and frame locks, which makes the bikes cannot be normally used as we expect. Here come the ideas if we can improve the design, maybe we can help solve this issue. We come to the idea that use nfc module to replace the traditional QR codes which can be easily obliterated. And hide the frame lock to the bearing of the bicycle to protect it from damage.

We went far in the way of improving the design of the existing product, and blend in some new thinking, such as modulation and combination. Some group members put up with the idea of multipurpose personal care product. By combining the function of shaver, electric toothbrush, even blower, you can go out just with one equipment with module you want to use. In the drastic brainstorming, ideas such as detachable trolley and wearable u disk have been brought up constantly. Considering the innovation and operability, we chose the mouse contractor ring as our aim.

As we all know, mouse is an important device for computer using. In today’s information era, because of the need of computer in every aspect, people use it almost every day. Gradually, mouse has become a necessary thing in both work and life, but sometimes it doesn’t work very well as we wish. For example, people might be faced with some kinds of situations where people can’t find a flat table or just have a little space. And in these situations, mouse gets unmovable because its huge design. So we determine to design an innovational mouse called “Ring-X” to solve this problem and make the experience empowering and interesting.

We give this project a fancy name, RingX, which indicates its infinite possibility to realize amazing functions. But a journey starts from a foot step. We form this idea from a very common annoy thing. Image the situation that you have just order a cup of coffee in Starbucks and opened the Adobe Photoshop to do some work, at that moment you find yourself forget to take your mouse with you, and your well-prepared schedule has been ruined. Or when you pick up your new Ultrabook which is super light and prepare to go out, then you glance at the stupid mouse in the table, feeling unwilling to carry it on. There annoying situation are the scene where our design product can should extraordinary advantage.

One possible ideal: modularization：

However, a simple function of the mouse controller is still a bit skimpy. Also, it can't be the reason and motivation for people to abandon carrying the mouse. We must augment both the quantity and effect of rational functions beyond the basic function of the mouse controller, so that we can make our products more innovative.

Nevertheless, if we add too many functionalities on a single ring, its size and power consumption will increase inevitably. And that will be contrary to the portability of the RingX, which is our original idea. To avoid this, we have come up with an idea of using modularization on RingX to achieve the goal of both increasing functionality and maintaining portability. Furthermore, the concept of modular design will make our products more targeted to each person's demand and make people choose our products willingly.

With regard to modular design, we made a simple brainstorming which put forward an initial imagining of the modularization on RingX.

Firstly, we can separate the battery, the elementary functional part and the sensor into three basic modules, the battery module, the basic functional module and the sensor module. This procedure is divided into two purposes. On one hand, it can tally with the modular idea of the whole product, on the other hand; it will address the issue of battery life through another way. When people have requirements of continuous using for a long time, they can either install more battery modules on the ring or carry multiple charged battery modules in the pocket according to their own habits. By this mean, we can deal with the insufficiency of battery capacity.

Secondly, modular design will provide more targeted services to the diverse demands of different groups. We initially conceived the professional modules, cell-phone modules, clock modules, and modules for teachers, sports amateurs and photographers.

Professional module is the expanded functional module beyond the basic functional part. Thus the modularization of the base function modules, we could reduce the bulk and the amount of the keys of the base module further, through which we can increase the portability of RingX. And for people who need a RingX more versatile, we provide a professional module to meet their needs. Professional module includes one-key playing, volume adjustment, underscoring tools, eraser, etc.

The mobile phone module is intended for people who want to receive and display mobile messages instantly on the RingX. The phone module has a warning light which flashes when a new message is received if a cell-phone or iPad has been connected. The clock module, designed for people who wish to display time on the RingX, has a screen that shows the time when the user clicks on the screen. Cell-phone module and clock module may be merged into a multimedia module in future design, but its extraordinary power consumption rate will be a scruple.

For the teacher module, we have added a semiconductor laser, which can be launched with the same laser pointer as the existing laser pointer on the market, providing the laser indicating function. In addition to the laser pointer, there will be two buttons, which provide rapid and convenient function of PPT controller. The sports module will provide the function of heart rate monitoring and motion rate detection, which can record and quantify the user's exercise habits. The camera module can be linked to a digital camera or a mobile phone, providing a wireless shutter function that lets users shake off the cumbersome wireless shutter when using the wireless shutter or the wireless flash function of the camera.

Furthermore, for the people who have a sick shoulder, elbow or wrist, we can customize RingX for them through the cooperation with medical institutions. The customized RingX can provide them a more convenient choice to control the mouse pointer by a limited degree of freedom their arm can attain.

Functional mode we have conceived:

The RingX have two modes to control the pointer of the computer. It contains several sensors. In the first mode, you can control the pointer just with your finger moving in the air, when your finger move vertically or horizontally, the sensor will receive the data and analyses it to give related instructions to the computer.

In the second mode, your index finger will play the part of infrared sensor. When you swap your finger in the table, the pointer will follow the track. And there are some buttons on the one side of the circle, when you tap these button, they can realize the function of the mouse button. And the ring could recognize several gestures of your fingers. by using specific gestures, you can realize functions, such as copy and paste. With these basic control function, you can go out without your old mouse, and doing some works without removing your hand from the key board, which means improvement of efficiency.

The Target Population:

To make our product more marketable, we try to find out the target groups the ring mouse may attract.

The first aimed group we thought may be the young people who really dare to try brand new things and are willing to catch up with fashion. The characters of early adopters and others they have make them an ideal throng of people. In order to meet their needs, we are supposed to design not only a product with technology, which could fully satisfy the imitation of a mouse, but also one with really fashionable cool exterior. Needn’t be an art work, but look with rich sense of technology is vital. But another limitation this target group sets is the enough low price of the product. Because they are young people, many of them have a low salary. Some even doesn’t have a steady job. We can’t put too much upmarket technology on it and should control the cost price within the acceptable range, by which we can lower the price.

Another group of targets is office worker like white collar. On the one hand, in the office the table is always small and covered with a lot of files and paper. Maybe there is not enough space remained to freely use a mouse without limitation. Of course, if the room is enough to put a mouse on, filling the space with other important files instead of mouse probably is a better way to use it. On the other hand, some of office workers are often away on official business once or twice a month, even more than that. Under this circumstance, a convenient portable ring-mouse is exactly what they really want. So the product we provide must be cabinet and easy to be carried on. One of the solutions is to make the item wearable. That’s exactly the original thought we have, to make a mouse as a ring.

Of course, other kinds of people can also benefit from using our brand new mouse. They could operate the computer with any gesture they like or control a PowerPoint with just moving a finger. What’s more, we provide many function parts and people can choose which to put on according to their own needs. We are also trying to put some sensors on it to make the product more humanized and intellective. With all elements above, our new mouse could fit everyone’s different needs with just one. In another word, any people could be our target group, as long as he has a computer.

Problems and solutions:

We team RingX have made a strong idea that we will make a special ring that can be a mouse controller and it is a wearable device for those who are tired of ugly and heavy mouses. Maybe it is kind of impossible and hard to make it, but after our brainstorming, it’s the best of our ideas. However, life is realistic, we cannot be so capricious because we have to finish our course work and pages. The RingX is kind of impossible, we have to give up it. But at the same time, it is just like our kids, we cannot just go away. So we decide to do something to achieve some of the RingX functions. It is what we have done these days.

If we really want to make a product like what we have conceived and which can complete all the functions, it is so diffcult for us seven freshmen for the technology of a ring mouse is high-end. So we have to take the second best. We can not make a ring but we can expand its size, which finally becomes gloves. After careful consideration, we still named it RingX.

Although we had made the decision that we are going to do the project RingX, there are several realistic problems for us to deal with. We have raised our ideas and free time to solve these problems.

Above all, the very first problem is that although we seven students come from multiple majors and this is perfect for us to solve different parts of problems, our majors have less strong connection to the course than machinery majors. What’s worse? The basic electronic problems and welding operations are difficult for us who have not been systemic studying and have no essential instruments. However, these are the first problems for us to solve. We decided to make it by ourselves. So we try to ask some with professional majors elder students for help. For example, Nick Lee asked his senior friends for the basic electronic operating tools. We others try to look up to the enormous major books and find the essential rules to solve our problems. Well, in other parts of the work, just like pages making, we have better advantages than other groups because we have Fier Liu to make this, her major is “New Media Art And Design” and she has already done the similar things as homework. It’s just like the midst of sadness, right?

Additionally, the next problem is a fatal one. As we all know, traditional electronic technology can paint electrocircuit on the silicon with special machine instead of doing welding works by hand. It caused that we cannot make an electrocircuit board by ourselves independently. That’s to say that we’d choose to copy one of exist electrocircuit board and bear its enormous shape and basic capacity. However, our idea is to create a different ring-mouse called RingX. X means it will suit more and more functions. How can we call a plagiarize work RingX? We decided to do some work to change the awkward situation and do something different to prove us is no any weaker than other teams. Our solution is simple but creative. We bought several different mouse-like tools which can take the responsibility as ppt controller and mouse controller, and after that, we disassembled these tools and hoped to find some similarities and the accessible way to make it. This way, we understand that although we cannot create an specific and small enough electronic board to meet our requirements, we can assemble different parts of electronic board and make it a new product.

What’s more? There are always difficulties lying on the way to success, and the only way we can make it is to throw it away. The next problem we meet is that the shape of ring-mouse that being made by us cannot suit the shape of finger, which means that we cannot make a ring to be a mouse controller, because the PCB cannot suit our fingers, it looks like a letter L, we originally decide to make the PCB tied on the left surface of our index finger, but the shorter across of L orientate to left, cannot cover the top of the finger. It’s a depressive news for us because the click button haves to come out, which means if we don’t cut up the PCB, it cannot achieve our aimed functions. After a long time thinking, we have made the decision that to cut the click button off the PCB and use some electronic wires to connect the buttons and the PCB. We find the welding gun and welding soldering tin to make it. Fortunately, it’s useful and Hantao Li and Shuyang Wang do this work by hand. Although they have not learned the essential electronic knowledge, they read three thick books to learn how to operate on PCB by themselves. However, there are more problems，soldering tin will react with taps and it’s easily broken and caused short, so we spend a lot of time using different taps to cover it to prevent it from damages.

Eventually, we have finished the basic first generation of RingX. It looks like a black stick connected to two black small buttons. It’s finished but it’s ugly. It owns basic functions but it cannot be carried easily by hand only. It’s quite different from our first thoughts. We think that even if we cannot achieve our first idea, we should make this little machine better looking. But how to make it, or in other words, if we should make a bigger hull to cover it? If so, what’s the differences between ordinary mouse and RingX? In this way, we decide to make something different from the stupid cube. We choose the best idea which come from our next brainstorming, that is make a special glove to cover the machine and improve the exterior. Nick Lee and Hantao li found a tailor who is willing to sewing this machine into the glove.

Real product functions display and summary:

Our product which is called RingX is aimed at producing a wearable device which, to some extend, can implement certain mouse functions with a shape that looks like glove. Due to technical limits, we can't tansfer the functions of a mouse to our glove perfectly, but we can realize some simple mouse operations such as leftclick, rightclick. Based on these basic features. And these are functions of our product . Next I'll give a detailed introduction of our product.

RingX, our product, is a wearable device. And this is an electronic equipment so we need to make each part smaller, more sophisticated and more integrated. The shape of our product looks like glove or somehow just glove and a band. It can cover our index finger and has a band around the wrist. The glove is made by diving suit fabric and inside the glove there are two touch buttons, which are the main functional buttons of RingX. The band concludes two other parts of the product. One is the core circuit module, another is the battery module. The whole circuit is like a micro mouse’s PCB. And it contains all links of the RingX, which is the core processing unit. Battery module, which provide all the electrical energy required for the system. This part is consists of a seven-cell battery. These two module are all covered by the band.

As for the function module. At the tip of the index finger, there is a light-emitting diode and small optical lens assembly as well as a kind of optical sensor. All these can convert the shift signal of finger movement to pulse signal so as to realize the control of the movement of the mouse cursor. On the left of the glove, we set two light touch keys to simulate the left and right keys of the mouse. The overall design of the finger covers is ergonomic, so you can easily click with your thumb to complete the click and double click. if you want to open a exe, file or a folder, you just need to click on the left button. If you want to see the details of a project or do some other operation, you can click on the right button. If you want to complete the drag of the files, you can move your finger as long as you press the left button. These are the fundamental operations that RingX can realize. As for the PPT controller function, under the mode of the PPT projection, if you click on the left button, PPT will page down.

We modularize each part of the mouse and connect all units by fine electric wires. Through these, we can make a more flexible device. Our glove is made by single fiber so we need to separate the whole block of PCB to make the parts appear less visible inside the glove.

What’s the advantages of the RingX? Or in another word, what are the distinguishing features of it compared to other mice? Anyhow, common mouse has some drawbacks, such as the inconvenience of carrying, too large volume, the use of the environment is more stringent (it is not convenient to use in the non-flat or narrow interface). The long use of the normal mouse can even cause a disease called mouse - hand formation. However, these are no longer problems in front of our products RingX. RingX has glove shape so it is more convenient to carry and its demand for the use of the environment has been greatly reduced. We can use RingX on our clothes, pants or more narrow interface. Because of its wearable features, it becomes more attached to the fingers so we will use it more comfortably. The mouse-hand formation will emerge less.

Maybe our product can not meet all the demands of a functional controller. But it’s a great ideal to create a wearable device which is the future trend in product development. Nevertheless, the time left for our group is very tight, and our team's technical expertise is not high. Owing to these, we can not make our product as perfect as we have conceived. But that’s not important, after all, we indeed realize some functions of a mouse. What’more, we want to convey a concept or an ideal that make technology more convenient, and make the device wearable.