

# Coursework 3: The Process Document

Group 18

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## 1 Team member and username:

Table 1: Member Table

MemberName	Username	SWJTU ID	Leeds ID
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## 2 PACT Analysis

Through the PACT interaction design box, we can define the problem of "under what circumstances do people accomplish what activities with what". People carry out certain activities in the context through certain technologies: what people use for what tasks in a certain scenario. This sentence contains the four key elements of PACT: people, activities, context and technology.

### 2.1 Persona:

Charles, 27, is an extreme sports enthusiast who uses a GoPro motion camera to record his own videos. He is also the father of two children. He wants to use the player to view mountaineering videos on his mobile device when he is outdoors and daily life videos from his desktop or projection device at home. When climbing outdoors, Charles needs to do as little as possible to get the most functions, such as fast forward, skip, full screen, pause, etc., because it is very dangerous and carries a lot of things. At home, Charles hopes to use the player to watch home videos as fluently as any other major browser on the market.(The characters are based on real investigation, but the content and details are fictional.)

### 2.2 Scenario:

Charles climbed the mountain alone in a light fall rain. He wanted to see what creature the unidentified black object had been running toward two o 'clock at the crash landing thirteen minutes earlier. In rainy days, it was slippery and the speed drop point was narrow. What was worse, the falling leaves would constantly fall from the sky to block the sight and interfere with the movement. He had to stabilize his body with one hand and operate the mobile device with the other hand to watch the video recording. Due to the treacherous environment, Charles quickly hops through the video and scrollbars nearby to view that frame. After Charles drags the progress bar to the appropriate location, fine-tune it with the fast-forward 5 seconds button. Finally, in the video clip of 13

minutes and 47 seconds ago, I found the shadow passing by. After remembering the time, Charles pressed the pause button and was surprised to find that the figure was a black bear. Charles was very frightened, but at the same time glad that he had found the source of danger quickly, so he hurried down to safety as fast as he could.

### **2.3 Scenario:**

Charles decided to return home early from the outing with his family due to the overcast weather. To make her daughter happy, Charles decided to play a video clip from their outing with a video camera. There are many of these clips, and Charles selects the most interesting one to play through the sidebar. He adjusted the volume and went into full screen mode. After playing for some time, his daughter suddenly wanted to go to the bathroom. Charles pressed the pause button and quit full screen mode. When they returned, Charles found another video he wasn't familiar with, so he opened it and dragged the progress bar to check it out. After checking it, Charles found that it was a new video he had not seen from his last fishing trip. Charles then searched for the name of the video and found the unfinished video, which he watched with his daughter. Charles believes that if the player has the ability to filter video by category, time, or name, then the player will become better and more convenient for users to find video.

## **2.4 People:**

Human is the ultimate perceiver of interaction. Human is always at the center of design. Design for different people is the balance of differences. 1

### **2.4.1 Primary:**

Outdoor or extreme sports enthusiasts who use professional sports video equipment, such as GoPro, to record their activities or the scenery around them, such as mountain climbers, cyclists, parkour athletes, downhill skiers.

### **2.4.2 Secondary:**

A person who works in sports or contacts sports activities. For example, fitness coaches, physical education teachers, referees and others who need to watch videos to study sports information.

### **2.4.3 Tertiary:**

Other ordinary users who need to use this player to play personal videos. For example, the elderly who are keen on square sports; Families with a habit of recording videos for ordinary activities; Users who take pictures and record what happens around them in their daily life.

#### **2.4.4 Physical differences:**

For first-level users, their physical characteristics are young, energetic and between 18 and 30 years old. A disability that does not affect physical activity. Strong athletic talent.

For the second level users, their physical characteristics are relatively prominent middle-aged, maintain a high physical quality. Between 18 and 40. Good body function, good at sports. Diseases that do not affect exercise or have achromatopsia or other diseases that have a low impact on exercise.

For the third level users, their more prominent physical feature is the general lower motor ability. Age range from 30 to 70. Maintain a healthy exercise system or suffer from a part of the disease that causes movement disorders.

#### **2.4.5 Psychological differences:**

For the first-level users, the psychological quality of users is generally strong or tend to pursue exciting extreme outdoor sports. Users have the spirit of challenge and active exploration. They generally have a strong ability to accept new things, and they have a relatively excellent learning ability. They are more likely to look approvingly or encouragingly at creative or experimental things.

For the second level users, users have more direct psychological activities. Users are more likely to expect concise or straightforward information. They have a need for easy-to-use and ready-to-use tools. Users expect to spend more time physically than mentally.

For tier 3 users, users are willing to accept new things, but do not agree with new things that are difficult to use. Users have relatively fixed psychological activities. In addition, users are eager to achieve more convenient requirements through tools. Users also expect more functionality from the tools they use.

#### **2.4.6 Mental models:**

For the first group of users, the term thinking mode of the user may be called inspirational thinking, also known as Epiphany or intuitive thinking. Its expression mode is more lively. Users like to think in leaps and bounds, they are curious about everything around them and want to explore how it works.

For the second type of users, the user's thinking mode belongs to what can be called intuitive thinking or image thinking. The way of expression is more direct, through the most vivid figure or thing, using imagination to get similar induction to draw a conclusion. Users like to get the most intuitive information from the simplest way of thinking (though the way of thinking is the most complex in the human brain). The user expects to get the maximum benefit with the minimum input.

For the third type of users, the thinking mode of users belongs to abstract thinking or logical thinking. After careful conceptual examination, users make judgments and finally map out the information expressed in the real situation through reasoning. Such users have a more mature but also older way of thinking. Users prefer familiar and safe operation or usage. They like to make things traceable or more common sense.

#### **2.4.7 Social differences:**

For the first category of users, the social status of users is not relatively clear division or definition. What is certain is that such users have relatively considerable income or are willing to invest in their favorite sports to a large extent. Among them, extreme athletes or extreme sports enthusiasts may have relatively easy or time-flexible jobs.

For the second group of users, the income of users is relatively stable, and the reasons for using the player may be occupational needs.

For the third group of users, the social status of users covers all levels. Income also varies.

### **2.5 Activities:**

The user completes the user activity on a page. Buttons are distributed throughout the screen. Most of the screen will be used to play the video. There are play, pause, fast-forward, skip, backout, volume, full screen, and other add-ons. Sports (outdoor activities, extreme sports, physical activities or other daily activities), used throughout the day (any time period).

#### **2.5.1 Temporal aspects:**

Regular or infrequent: In general, the time users use the player is not fixed and irregular. For category 1 and category 2 users, users use the player very frequently. The third type of user uses the player only when necessary.

Quiet or busy time: Since the duration of the user's use of the player is uncertain, it can be assumed that the user is likely to use the player during both idle and busy periods.

Continuous or interrupted: Most user operations are of the interrupt type. The user pauses repeatedly to observe different details or make notes accordingly. However, continuous type operations should not be denied in user activity. Therefore, the player should consider both user operation types and meet the

corresponding functions.

Response time: Because this player is a lightweight player, you should maintain a fast response time.

#### **2.5.2 Cooperation:**

This player is a stand-alone local player, without collaborative operation, and all user activities are completed independently by the individual users.

#### **2.5.3 Complexity:**

In designing the user experience, the team focused on simplicity because of the directional nature of user types and player uses. The whole player will give the user explicit hints, so that the user can quickly achieve the goal when they want to perform an operation. No need to look up or adapt and learn. Function modules will be displayed adjacent to the same space to speed up interactive behaviors.

#### **2.5.4 Safety-critical:**

Generally speaking, errors should not cause injury or accident to the user or user data, and errors in user activity should not affect the normal use of the player. The user should get the correct feedback after the correct operation after the operation back to the previous state. And for the player itself error, in addition to the system warning should not have other adverse effects.

#### **2.5.5 Nature of content:**

There are not many mistakes in the content.

No input operation in the player, all rely on click to complete.

The player contains text, audio, video, and images.

To get the video data, you need to edit the video file description.

### **2.6 Contexts:**

It is difficult to use in some more extreme environments, such as low power or the inability to use electrical appliances. In addition, when using a player on a mobile device, it may be difficult to operate due to external environmental factors.

#### **2.6.1 Physical environment:**

The user's environment with the player will cover all areas where mobile and desktop devices can be used. Such as valleys, jungles, homes, offices, and public places. Climate, temperature and other natural conditions will have an impact on user activities, but will not have any impact on the user's use of the player. Users may use the player in quiet private places or in noisy public places. This will have an impact on the user's auditory experience. Network factors do not affect the player.

#### **2.6.2 Social & legal contexts:**

The main function of the player is to play videos. The faces appearing in the videos inevitably involve privacy issues, which requires users to spontaneously generate privacy protection measures. The main functions of the player are video and audio, with low privacy protection in public places. Users can avoid privacy disclosure by wearing earphones and other means. At the same time, users should abide by both ethics and the law. In a social environment set in a public place, users' activities of playing videos should not affect others. For example, do not turn the volume too high to make noise, and do not play videos or audio clips that may have adverse effects on the society or violate laws.

#### **2.6.3 Organisational context:**

The organizational environment inevitably influences the project. Teams are clearly divided but not hierarchical. The team adopted agile development and experimented with extreme development methods. Work in pairs. The written part shall be separately completed by one person. Most organizations use offline real-time communication, and in special cases, use online social tools to communicate. For files, each member of the code section manages its own section. High security. For version control, the team uses GitHub to set up separate folders and set permissions on the final folder, managed by one person. Overall safety is higher.

### **2.7 Technologies:**

Input: Mouse, Keyboard, Multi-touch (for macOS user)  
Output: Display, Speech, Executable codes

Other: Apps, phones, storage device and PC.

## **3 The platform and what design for:**

The team's target platforms include desktop devices as well as mobile devices such as smartphones such as the iPhone. This team uses Qt as the development tool, including c++ and Qt Designer as the development technology.

## **4 Cycle I:**

The functions to be completed in cycle 1 include: the ability to select a video; The realization of horizontal layout (landscape layout and portrait layout); For videos with no cover, display a blank cover.

### **4.1 Prototype:**

#### **4.1.1 The goal of this cycle:**

The goal of this cycle is to achieve the most core basic functions that the player should have, so that the player can be developed in line with the team's expectations and become normal use. The primary task is to provide users with a normal and reliable user experience. For example, a working video selection function is implemented so that video selection thumbtacks are no longer randomly and dynamically arranged and not scrambled. In addition, a more basic responsive layout should be implemented to take into account the different devices. This goal will be reflected in two distinct layout effects, horizontal layout and vertical layout, in order to improve the more normal display effect on different devices. Finally, the team modified the cover of the video preview to improve the user's visual enjoyment. For example, add a fixed blank cover for a video without a cover.

#### **4.1.2 The name of the prototyping technique and software used:**

Low fidelity prototyping, sketch, suitable for early use and easily improved.  
Software or technology used: paper.

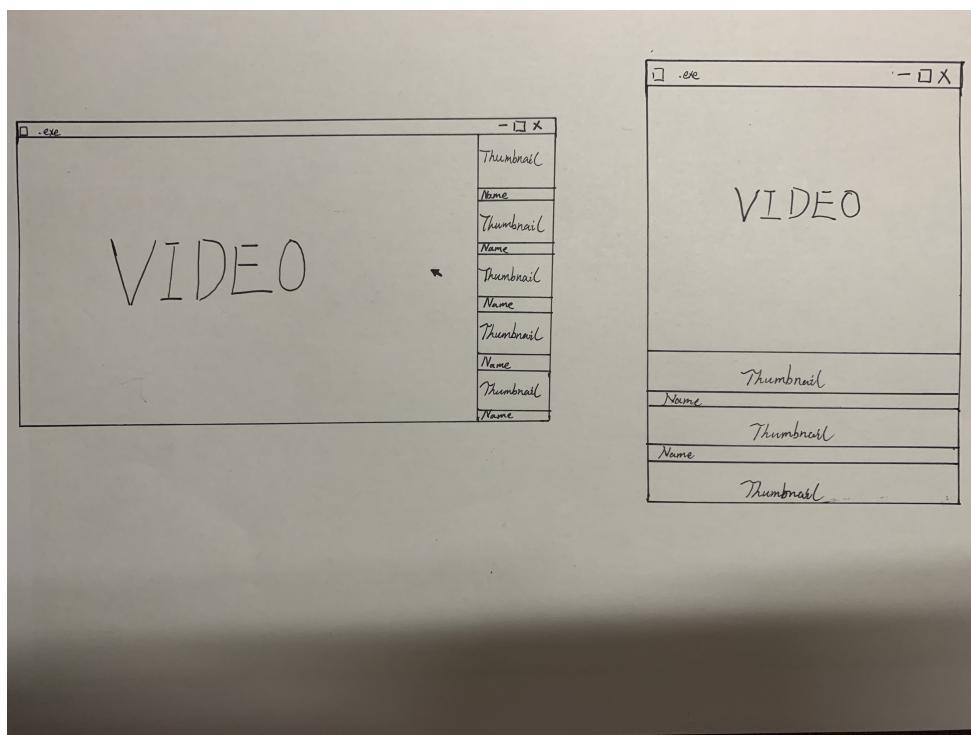
#### **4.1.3 The motivation of the design shown in the prototype:**

The design motivation for this prototype is to build a simple user interface that implements the core functions of the mainstream player. Its core function should be consistent with the popular player software in the market at the technical level. For other functions, the team should also reserve corresponding space, so that users can get a quick and comfortable starting experience with minimal effort. Due to the special type of user of the player, the user interface should achieve as much functionality as possible in the smallest possible operating space. This ensures that the user can achieve the desired goal with minimal movement while using the player with one hand. To achieve this, select video features should be placed at the bottom of the application for users to slide, while other functional components should be placed below the video playback to prevent excessive operation. At the same time, the team considers that right-handed users are in the majority, so the video selection function will be displayed on the right side when the user holds the horizontal mobile device.

#### **4.1.4 The reason for the chosen technique:**

The main reason the team used the sketching method in the low-fidelity prototype in the first cycle was that the method could easily be changed or improved. Sketching saves a lot of time when it comes to composition, and at the same time ensures the quality of the information provided to us. Since this is the first cycle, prototype or concept changes are extremely easy to make, and the team encourages a wide variety of different ideas in the first cycle. In order to acquire prototypes more quickly and make changes to the original prototypes more easily, the team decided that it was most appropriate to use sketches as prototypes for the first cycle.

#### **4.1.5 Evidence of the design:**



## **4.2 Evaluation:**

### **4.2.1 The name of the evaluation technique used:**

The assessment technique used for this cycle is heuristic assessment. The specific process is as follows:

1. Set the scope of the review: Heuristic assessments need well-defined goals that are clearly articulated to the assessor. The scope of this review is to see if the results are achieved by users following their normal habits and working

- with existing features on the prototype.
2. Understand the user: Evaluators must apply the same perspective and goals as the target user when reviewing the interface.
  3. Heuristic method for determining availability: Visibility of system state; Connecting systems to the real world; User control and freedom; Consistency and standards; Prevention of errors; To recognize not to recall; Flexible and efficient use; The design is beautiful and simple.
  4. Evaluate the experience and identify usability problems: Evaluators browse the interface separately and perform pre-assigned tasks. When they encounter usability problems, they should record them in a table, along with what task they encountered, which page was the problem, and which heuristic principle was violated.
  5. Analyze and submit results: After all user experience experts have completed the evaluation, the results should be summarized, duplicate problems deleted, and a short list of usability problems to be resolved.

#### **4.2.2 The describing of why this technique was chosen:**

Heuristics are well suited for early in the product development life cycle and are a powerful tool for identifying key usability issues in a short period of time. This approach lets the team know what is missing from the current prototype and how we can improve it in the next phase of development. They can also discover product ideas and point the way to design, often including usability checking methods or usability testing on low-fidelity prototypes. It can serve as a starting point for deeper usability testing and user research. In addition, heuristic evaluation is flexible, and we can develop a set of heuristic method principles based on our own experience and user data. Compared with other user experience survey methods, heuristic evaluation method is relatively quick and easy, and is more efficient in terms of providing value and required resources. But in contrast, sometimes heuristic evaluations produce subjective results and lack evidence.

#### **4.2.3 The describing of the outcomes of the evaluation:**

From the evaluation results, it was clear to the team that the player had some functional deficiencies and needed to make further improvements to the page layout. This was expected by the team, and this is what the team wanted to achieve. As shown in the following section, the team needs to continue to add pause, progress, and time display features that the player should have. This part will be implemented in the second loop. Features such as fast forward, volume and improvements to the user's visual sense will be implemented in the third or future loop. This indicates that the team's primary goal in the future cycle is to optimize the user experience.

#### **4.2.4 Evidence of the evaluation:**

- 1: Completely unable to meet the demand
- 2: Only a small amount of demand can be met
3. Basically meet the demand
- 4: Can meet the standard
5. You did a great job

Target of inspection	Weight	Problem	Note
Visibility of system state	3/5	No play time display	Add playback time
Connecting systems to the real world	3/5	Without the full screen	Add full screen functionality
User control and freedom	4/5	Some basic function are missing	Add the basic components in succession
Consistency and standards	5/5	None	
Prevention of errors	4/5	None	
To recognize not to recall	2/5	Without too much representation	Add click effects
Flexible and efficient use	2/5	It's not efficient	Optimization of the layout
The design is beautiful and simple	3/5	Color too old	Change the color scheme in the future

### **4.3 Code:**

**4.3.1 The video illustrating the changes compared to the previous version:**

**4.3.2 The link to a code repository with the developed code for this cycle:**

**4.3.3 The describing of any differences between the prototype and the implementation because of the evaluation or technical difficulties:**

In the actual implementation process, the changes to the prototype are mainly the addition of scroll box elements and the addition of the border of the video thumbnail. Adding scroll box elements helps users enjoy greater selection possibilities within a smaller range of operations. Increased player ease of use. Add a video thumbnail border to make the thumbnail look more like an actionable button. Giving users more explicit instructions also gives users more explicit operational boundaries.

## **5 Cycle II:**

The functions to be completed in cycle 2 include: play pause and continue buttons; Select the scroll box of the video control; Display of playing time; Play progress bar display and drag function to achieve.

### **5.1 Prototype:**

#### **5.1.1 The goal of this cycle:**

The goal of this loop is to continue to add core functionality to improve the player user experience and achieve more. The first is to provide users with a more free operating experience. For example, the team implemented a video pause and continue feature that allows users to pause or continue a video at any time. In addition, the basic functions of the player should be improved for the user. To do this, the team implemented the player's progress bar function, allowing users to drag the bar to play the clips they wanted to play. Finally, the team created a better operating experience for users by considering the usage scenarios of the player. For example, the team added a scrolling area to the control for selecting a video, allowing users to have more choices through a smaller action area. Users can scroll or drag to get more video options.

#### **5.1.2 The name of the prototyping technique and software used:**

Low fidelity prototyping, wireframes(including horizontal and vertical wireframes). On the basis of modifying and perfecting the prototype, the shape and size ratio of each control is standardized. It shows the direction of development more intuitively and formally.

Software or technology used: Sketchbook

#### **5.1.3 The motivation of the design shown in the prototype:**

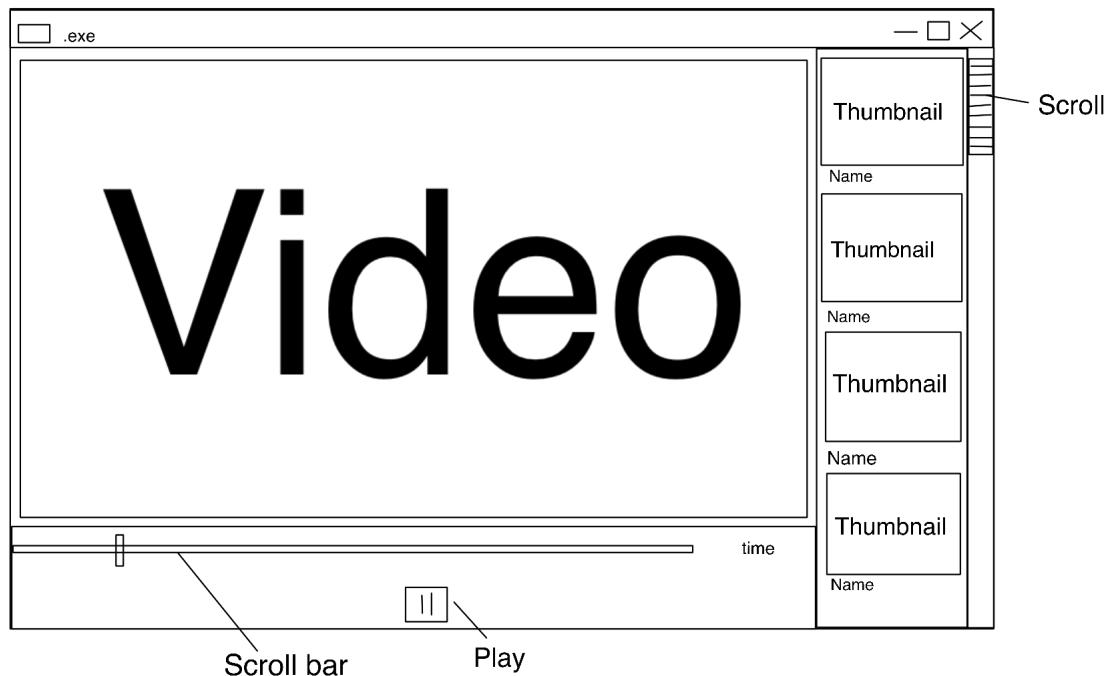
The design motivation of this prototype is to enrich the user experience and basic functions, so as to realize more functions that the player should have. Still from the market from the mainstream player style. Functions reserved in the first loop are replenished in this loop, and places are reserved for functions added in the next loop. This cycle further analyzes the user using the player environment background, continue to take the user type particularity as the starting point, as far as possible to achieve the control is convenient for users to use in special circumstances. For example, scrollbars are implemented so that users can have more choices within the minimum operating space. The second loop follows the idea of the first loop and continues to refine the scope of operations to make the user more aware of the size of each control's manipulable space. The team tries to keep the distance between components as far as possible while doing the basic functions, so as to prevent users from accidentally bumping or operating errors in this way.

#### **5.1.4 The reason for the chosen technique:**

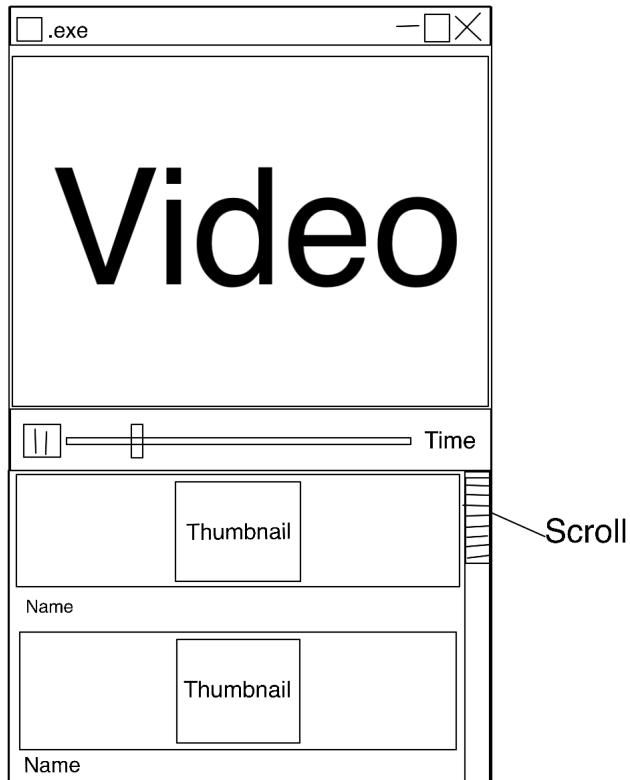
In the second cycle, the team chose to draw wireframes in low-fidelity prototypes mainly because this method was simple to operate and normalized the prototype as much as possible. When prototyping, the relative position and relative size of the various controls must be considered. The sketches in the first loop were not as elegant in terms of the shape and relative size of the controls, but wireframes solved this problem perfectly. The team has abandoned some of the factors of convenience and ease of modification in order to pursue the meticulous design and bring the most comfortable operation experience for users. In the first iteration, the general direction of development was initially determined. A more precise, normalized wireframe is clearly a better choice for a prototype without making too many changes to the prototype. But the team still encourages new ideas to enrich the user experience.

#### **5.1.5 Evidence of the design:**

Horizontal layout



Longitudinal layout



## 5.2 Evaluation:

### 5.2.1 The name of the evaluation technique used:

The assessment technique used for this cycle is cognitive walkthrough. The specific process is as follows:

Task: Select the video and then select the clip to play, and then change the video to play.

User: Young outdoor enthusiasts

Context: mobile devices, rainy days, woods

Steps:

1. Define user base: The user description includes the experience / technical background that can influence the user to learn the operation of the new product.

2. Select sample tasks:
  - (1) The selected task should be the core task of the interface/system, which is well supported by the interface/system.
  - (2) The task should be realistic, that is, the selected test task should reflect the user's use in the real situation as far as possible.
  - (3) The task is complete, rather than a separate operation of different functions.
3. Determine the correct sequence of task operations: After the detection task is determined, the operational steps of each task should be determined.
4. Conduct walkthrough: describe in detail the feedback given by the interface after operation.
  - (1) Is the current behavior consistent with the user's goals? (Conceptual model)
  - (2) Is the behavior visible? Is there a place on the screen for user action?
  - (3) Can the user have correct cognitive behavior? Are there proper labels?
  - (4) Can the user understand the feedback?
5. Build a story: Build a "success story" from the background of the user's knowledge to explain why the hypothetical user would choose the right action steps to complete the task.
6. Document important information

### **5.2.2 The describing of why this technique was chosen:**

Cognitive Walkthrough is also suitable for use in the early stage of development, and it can evaluate the user interface by analyzing the user's psychological processing process when the user interface is initially formed. This approach makes it easy for developers to analyze what people think and do when they first use a product, and then make improvements accordingly. Cognitive walkthrough allows the user to walk through a series of typical tasks/ scenarios, notice usability problems that the user may encounter, and make an analytical evaluation. The focus is on observing how easy it is for the user to complete the task and providing the developer with directions for improvement. Compared with other user experience survey methods, cognitive walkthrough takes more rigorous consideration of user needs and is more efficient in the early stage of development.

### **5.2.3 The describing of the outcomes of the evaluation:**

The above steps let the user walk through a typical set of tasks/scenarios and demonstrate that a working player has been implemented in the second loop. The disadvantage is that the player still does not achieve all the basic functions, but it does not affect the most basic use of users. For example, in the second loop, the functions of fast forwarding and searching video are still not realized. Users cannot realize skipping in a small scope and can't realize full-screen playback function. Users also can't quickly find the videos they want to watch through search, and the team still needs to improve these features. For the realized function, the test effect is shown well, but the control needs to be beautified. The team also had to further optimize user fluency and fine-tune the layout of the controls.

#### **5.2.4 Evidence of the evaluation:**

1. Is the current behavior consistent with the user's goals?
2. Is behavior visible? Is there a place on the screen for user action?
3. Can the user perceive the behavior correctly? Are there proper labels?
4. Can the user understand the feedback?

Step #	User action	Feedback	Understand the action?	See the control	Understand the control?	See the feedback?
1	Turn on the player	Open the player normally after a short wait. No exceptions.	yes	yes	yes	yes
2	Choose the video	After selecting the video, play the video normally, and the process is smooth.	yes	yes	yes	yes
3	Drag the progress bar	Drag the progress bar to make it feel smooth to continue playing the video from the stop position.	yes	yes	yes	yes
4	Stop video	Quickly find the button, press it and stop playing the video normally.	yes	yes	yes	yes
5	Play the video	After you press the button again, continue playing the video in the paused position.	yes	yes	yes	yes
6	Slide to find video	Slide the scroll bar, feel smooth, can browse the video list smoothly.	yes	yes	yes	yes
7	Turn off the player	Close the player normally.	yes	yes	yes	yes

### **5.3 Code:**

**5.3.1 The video illustrating the changes compared to the previous version:**

**5.3.2 The link to a code repository with the developed code for this cycle:**

**5.3.3 The describing of any differences between the prototype and the implementation because of the evaluation or technical difficulties:**

In the actual implementation process, the prototype changes mainly reflected in the size of each control. A more detailed size difference makes the user more specific about their area of operation, and the delicate size of the control will enhance the user's visual enjoyment. There are also subtle changes to the boundaries of the video playback box, mainly reflected in the elimination of the video border. This allows the video to be played in a larger area, so users will be more focused when watching the video.

## **6 Cycle III:**

The functions to be completed in Loop 3 include: volume control of the player; Switch the video back and forth; And full-screen playback function; The control is further optimized.

### **6.1 Prototype:**

#### **6.1.1 The goal of this cycle:**

The goal of this cycle is still to add more features to enrich the user experience by adding features. First of all, it provides users with a more free operation experience. For example, add a volume control bar. Users can drag the volume control bar like a video control bar to achieve the function of controlling the volume size, which can further improve the user's operation experience and enable them to enjoy more functions that can be used by mainstream players. Second, the player adds the ability to switch videos back and forth, which makes it more convenient for users to play the previous or the latter video. Avoid the disadvantage of having to select in the video selection box even if the next video is played in the first and second loop. Finally, the player added a full screen feature, which greatly improved the user experience. Users can be more engaged in immersive viewing on mobile devices or desktop devices. It avoids the disadvantage that the screen is too small to clearly distinguish the video content.

#### **6.1.2 The name of the prototyping technique and software used:**

High fidelity prototyping, Photoshop(including horizontal and vertical). The basic function is added in the reserved position of the second cycle, and the shape and size of each control are designed in a more detailed way. It more vividly shows the specific player interface and the standard shape and color of each control.

Software or technology used: Adobe Photoshop CC 2019

#### **6.1.3 The motivation of the design shown in the prototype:**

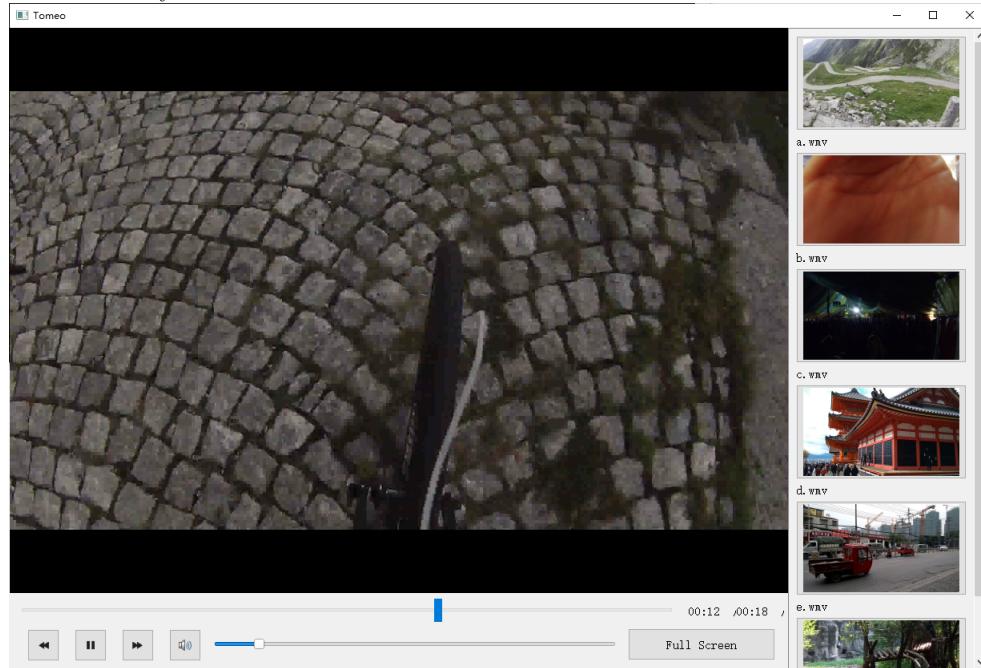
The motivation for this prototype was to allow developers to visualize their research and design plans, and to implement more basic user functionality. Also based on the market's main browser function demo. More controls are added in the spare space on top of the functionality in the first two loops. And set the tone for the next cycle. This cycle analyzes the special occasions when users use this player, carefully studies the user's operating habits, and measures the order of the progress bar and play cases. For example, more often than not, users will place operations on the progress bar, while right-handed users are in the majority. So the progress bar is placed on the right side of the player. In order to facilitate the user operation, the button of playing the last video and playing the next video was added.

#### **6.1.4 The reason for the chosen technique:**

In the third cycle, the team chose the more time-consuming, high-fidelity prototype Photoshop, mainly because it was a more intuitive way to present user requirements and design concepts to developers in a visual way. The use of high-fidelity prototypes makes them look more like the final system than the low-fidelity version. This allows developers to be clear about what they are trying to achieve. The team attaches great importance to the visual perception of users during the development process. For this reason, the investigation direction to be carried out in the fourth cycle is designed in advance, and the expected color scheme is restored in the high-fidelity model according to the temporarily less data. After the third cycle, the team will abandon the changes to the mature functions and develop new functions, and shift its focus to the user's operational experience and visual experience. Obviously, the hi-fi model Photoshop is better suited to this cycle. The precise color expression and detailed control design of PhotoShop will help the team understand their work more clearly.

#### **6.1.5 Evidence of the design:**

Horizontal layout



Longitudinal layout



## 6.2 Evaluation:

### 6.2.1 The name of the evaluation technique used:

The prototype evaluation method used in this cycle is interview. The specific process is as follows:

1. Design the interview outline.
2. Ask questions appropriately.
3. Accurately capture information and timely collect relevant data.
4. Make appropriate response to Bai.
5. Record the interview in time, and generally record or video.

### 6.2.2 The describing of why this technique was chosen:

The interview method can understand the target users most directly and objectively. It can understand the psychological needs and behavioral characteristics of users by talking with them face to face. This approach allows the developer to directly and subjectively understand what the user needs, what the user likes, and what the user imagines. By recruiting and interviewing users or visiting

users for interviews, it can simply and directly collect various user information. At the same time, it can guarantee the privacy security of users to the greatest extent (not reflected in written). While this method has significant advantages, it also has some fatal disadvantages. Interviewers need to understand the basic research methods of psychology. Interviewers need to take an objective view of users' subjective responses. The main reason why the interview method is still chosen is that it has good flexibility and adaptability. Interview target users can be flexibly adjusted according to their different needs. They can conduct fact-finding, opinion consultation and target users' internal testing of new functions.

### **6.2.3 The describing of the outcomes of the evaluation:**

Through the interview, we know that users expect to get more comprehensive functions, and users are very satisfied with the improvement of the second to third cycle. This cycle has produced better results. For example, users gradually shifted their focus from functional requirements to visual effects. In addition, users have also made good suggestions on the color scheme to be adjusted in the future cycle. Through the interview, the team also learned that the function of the player should be further developed. For example, add the fast forward key, add the video search function, and add the control border and more obvious clicking effect. From the interview, the team made it clear that the goal of the next cycle should be to modify the user's visual experience, supplemented by improving functions. It should also continue to focus on ergonomics and the combination of players.

### **6.2.4 Evidence of the evaluation:**

## **6.3 Code:**

### **6.3.1 The video illustrating the changes compared to the previous version:**

### **6.3.2 The link to a code repository with the developed code for this cycle:**

### **6.3.3 The describing of any differences between the prototype and the implementation because of the evaluation or technical difficulties:**

In this cycle, because the prototype used is a high-fidelity prototype. So the quality of the prototype, the size of the control, and the color scheme all tend to be realistic. The team pursues a perfect replica prototype. The actual implementation of the player is no different from the prototype, except for the subtle spacing of the controls.

## **7 Cycle IV:**

The functions to be completed in the fourth loop include: adding fast-forward and fallback functions; Beautify the overall interface (control border rounded display, background color beautify, video without cover slightly reduced beautify, play progress bar beautify, full screen icon graphic and volume bar beautify)

### **7.1 Prototype:**

#### **7.1.1 The goal of this cycle:**

The goal of this cycle is to optimize the user's visual experience by beautifying the controls and color matching to make the player more beautiful. First, in order to meet the psychological and visual needs of most users, the team adjusted the background color of the player as a whole. Considering that the majority of users are extreme sports or outdoor enthusiasts, the background color preferred the more advanced and concise space gray (taking inspiration from most of Apple's products). Secondly, in order to give users eye-catching reminders and prevent users from visual fatigue caused by monotonous, the team chose the eye-catching bright blue color for the played progress in the progress bar. Finally, in order to distinguish the background color from the color selection of other functional controls. The team opted for a simple black and gray. The team attaches great importance to the care and respect for different groups of people. The overall color selection has been tested by gray scale and proved to be able to be used normally.

#### **7.1.2 The name of the prototyping technique and software used:**

High fidelity prototyping, Virtual simulator(including horizontal and vertical). Software or technology used: xiaopu(Hi-fi prototype maker)

#### **7.1.3 The motivation of the design shown in the prototype:**

The motivation of this prototype is to allow users to enjoy the basic functions while gaining a better visual experience. The prototype eliminates the market research part of the previous three cycles. Through the analysis of user psychology, user category and user characteristics, the player style desired by users is depicted. Through these efforts, the team can meet the aesthetic needs of users to the greatest extent. Another motivation for the prototype was to get MacBook owners' attention. Rounded corner style controls are added into the player, highly in line with MacBook users' daily aesthetic habits. To attract a larger user base.

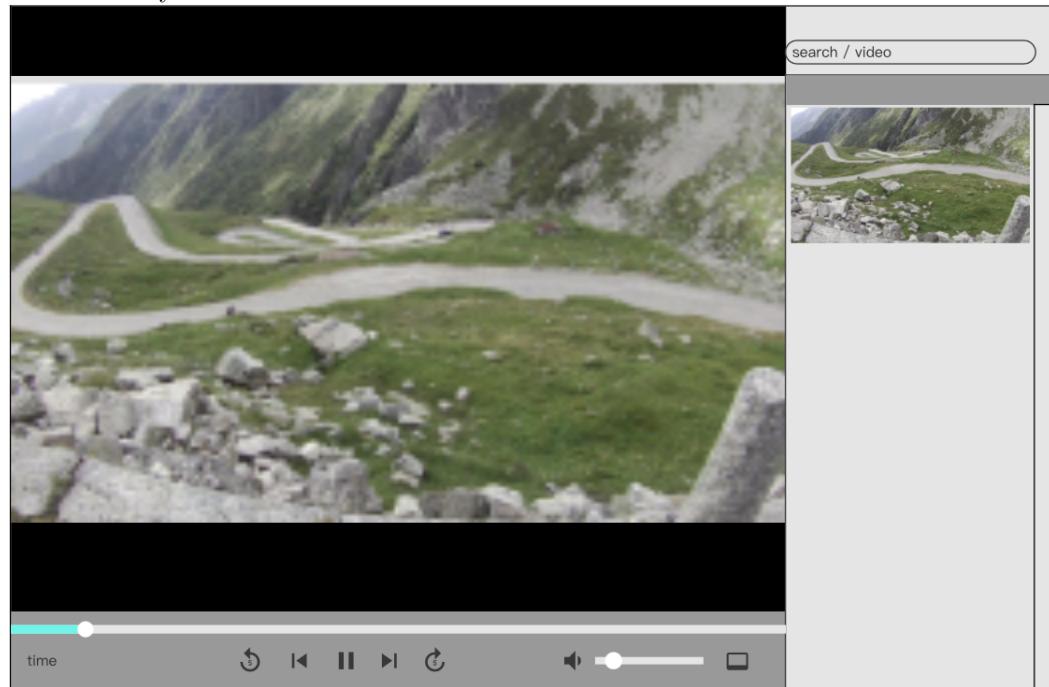
#### **7.1.4 The reason for the chosen technique:**

In the fourth cycle, the team chose a high-fidelity prototype virtual simulator that was relatively time consuming but highly recoverable, mainly because it

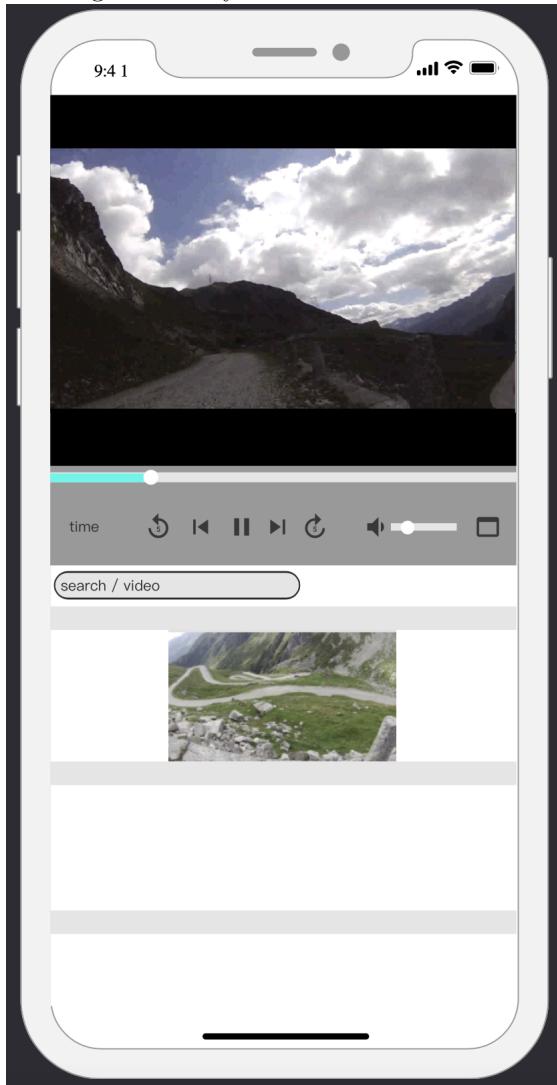
made the prototype more like the final system. The prototype is similar to the final product in color matching, control shape, control size, and control function. This allows the developer to further organize their thinking and have a clearer understanding of what the team is going to develop and what the team is going to achieve. High-fidelity prototypes are used by senior executives, bosses, investors, and other key decision-makers to help us carry out the rest of the fourth quarter. And can receive more real and valuable evaluation feedback report. High fidelity prototypes need to be based on low fidelity color matching, insert real images and icon ICONS. Take full advantage of the styles and proprietary interaction attributes of each type of component in Axure to add fidelity to the prototype, add interaction events, and configure interaction actions for related components and pages. From the perspective of visual display and interaction design, this is a completely high imitation of the Demo prototype.

#### 7.1.5 Evidence of the design:

Horizontal layout



Longitudinal layout



## 7.2 Evaluation:

### 7.2.1 The name of the evaluation technique used:

The prototype evaluation method used in this cycle is Questionnaire method.  
The specific process is as follows:

1. Grasp purpose and content.
2. To collect data.
3. Determine investigation method.
4. To determine the content.

5. Decided to structure.
- 6.A questionnaire
- 7.Recycling questionnaire

### **7.2.2 The describing of why this technique was chosen:**

Questionnaire method can obtain the most user data in the shortest time for analysis. It is one of the few methods that can carry out the survey of multiple people at the same time. By distributing questionnaires to users, the subjective needs of various individuals are understood. This method enables developers to extract large amounts of information from enough data to analyze, and the size of the data often determines whether the results obtained from the analysis are reliable. The questionnaire also has a high degree of flexibility. Developers can set the questions and the options or categories of questions by themselves, and only need to pay attention to protect the privacy of users. With a relatively mature questionnaire generator, the data can be classified and analyzed in a scientific way. And this cycle needs to analyze the user psychology and aesthetics, which needs a lot of data as the basis. Therefore, questionnaire survey is obviously the most suitable assessment method in this cycle.

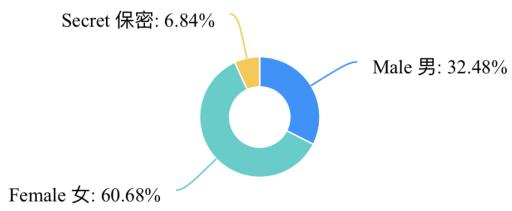
### **7.2.3 The describing of the outcomes of the evaluation:**

Through the questionnaire survey, the team has a better understanding of users' aesthetic needs. After the team analyzed the data collected from the questionnaire, the first version of the color scheme was presented. For example, with advanced space gray as the background, the control is contrasted with the background in a darker color. The progress bar uses a more striking bright blue color to prevent the aesthetic fatigue caused by a single color. At the same time, the team attaches great importance to the population of color-blind or color-weak patients. All the colors were grayscale tested, and the player could be used normally under grayscale. The team also analyzed the ratio of male to female in the user questionnaire. The design is carried out after giving weight to the color proportion. Ensure that the player's color and function Settings are acceptable to most users.

#### 7.2.4 Evidence of the evaluation:

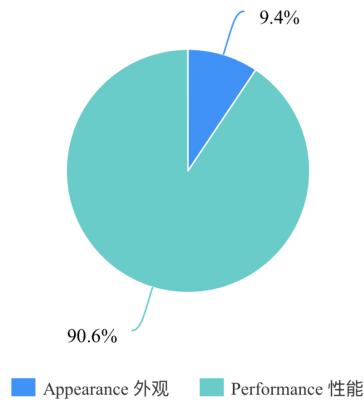
\* 1. Your gender 您的性别:

- Male 男
- Female 女
- Secret 保密



\* 2. Which of the following do you care more about the video player? 对于视频播放器您...

- Appearance 外观
- Performance 性能



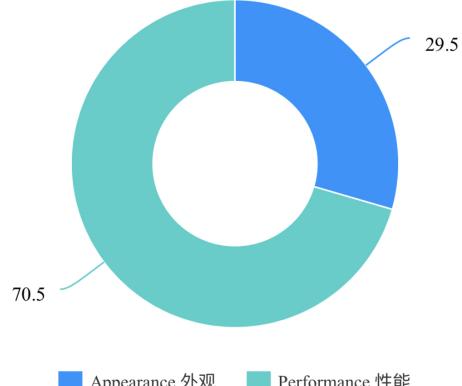
3. Please assign weights to the following options. 请您为以下选项赋予权重。

Appearance 外观

<input type="text"/>	0	20	40	60	80	100
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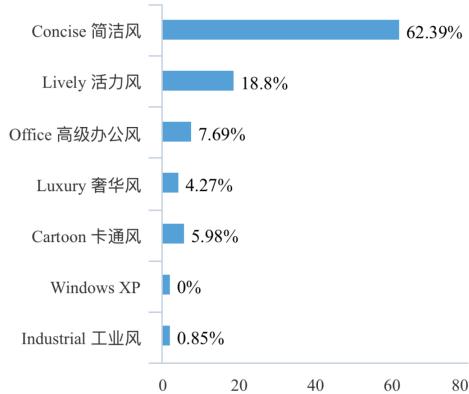
Performance 性能

<input type="text"/>	0	20	40	60	80	100
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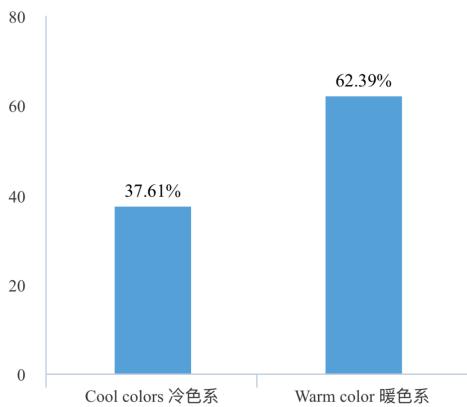
\* 4. Which style do you prefer for appearance? 对于外观，您更青睐哪一风格？

- Concise 简洁风
- Lively 活力风
- Office 高级办公风
- Luxury 奢华风
- Cartoon 卡通风
- Windows XP
- Industrial 工业风



\* 5. Which color system do you prefer? 您更钟爱哪一种色系？

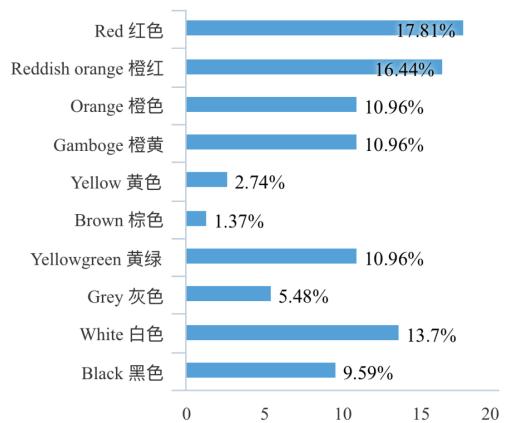
- Cool colors 冷色系 ([跳转到第7题](#))
- Warm color 暖色系 ([跳转到第6题](#))



\* 6. Which color do you prefer? 您更喜欢哪种颜色？

请选择

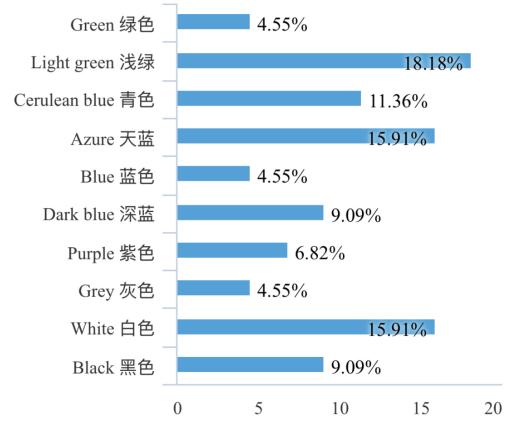
- Red 红色
- Reddish orange 橙红
- Orange 橙色
- Gamboge 橙黄
- Yellow 黄色
- Brown 棕色
- Yellowgreen 黄绿
- Grey 灰色
- White 白色
- Black 黑色



\* 7. Which color do you prefer? 您更喜欢哪种颜色?

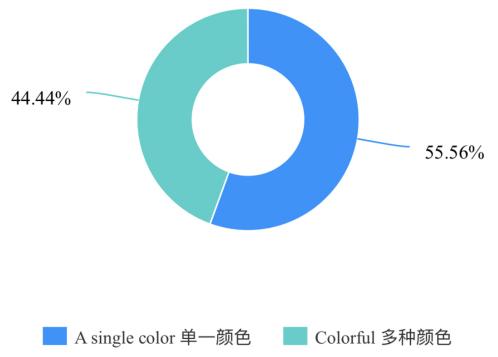
请选择

- Green 绿色
- Light green 浅绿
- Cerulean blue 青色
- Azure 天蓝
- Blue 蓝色
- Dark blue 深蓝



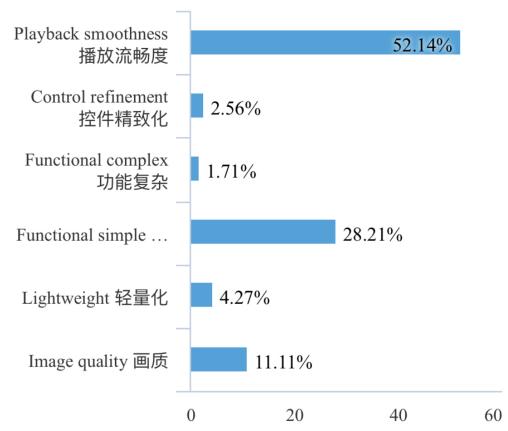
\* 8. Do you prefer to have the same color across player controls or do you want them to be colorful? 您更希望不同播放器控件之间的颜色相同还是希望五颜六色?

- A single color 单一颜色
- Colorful 多种颜色



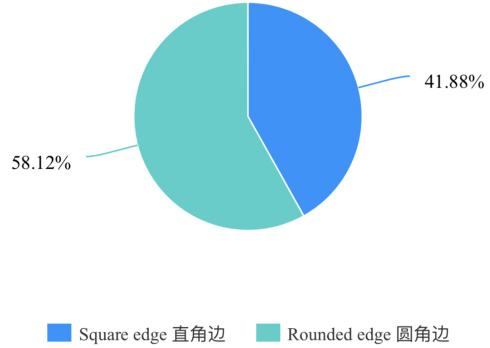
\* 9. Which of the following do you think is more important for the player's performance? 对于播放器的性能，您认为以下哪一种更为重要?

- Playback smoothness 播放流畅度
- Control refinement 控件精致化
- Functional complex 功能复杂
- Functional simple and necessary 功能简洁、必要
- Lightweight 轻量化
- Image quality 画质



\* 10. For controls in the player and borders you prefer: 对于播放器中的控件以及边框您更喜欢:

- Square edge 直角边
- Rounded edge 圆角边



### 7.3 Code:

7.3.1 The video illustrating the changes compared to the previous version:

7.3.2 The link to a code repository with the developed code for this cycle:

7.3.3 The describing of any differences between the prototype and the implementation because of the evaluation or technical difficulties:

This cycle uses a more high-fidelity virtual prototype than the third cycle. So the quality of the prototype is closer to that of the real player. The team also pursues a perfect reproduction of the prototype. The rest of the text is indistinguishable except for a slight difference in the text.

## **8 Cycle V:**

The functions to be completed in the fifth cycle include: the final perfection of the player function; The final perfection of the player color scheme.

### **8.1 Prototype:**

#### **8.1.1 The goal of this cycle:**

The goal of this cycle is to get the final version of the video player software. First, the team finalized the functionality. For example, the player added video information display. It includes the information display of the current playing video as well as the video information display beside the slightly shortened image. Secondly, the team adjusted the final version of the control shape Settings and control color Settings. For example, to cater to a larger age group of users, the team switched from a relatively bright color to a slightly darker color.

#### **8.1.2 The name of the prototyping technique and software used:**

High fidelity prototyping, Qt Designer(including horizontal and vertical).

Software or technology used: Qt Designer

#### **8.1.3 The motivation of the design shown in the prototype:**

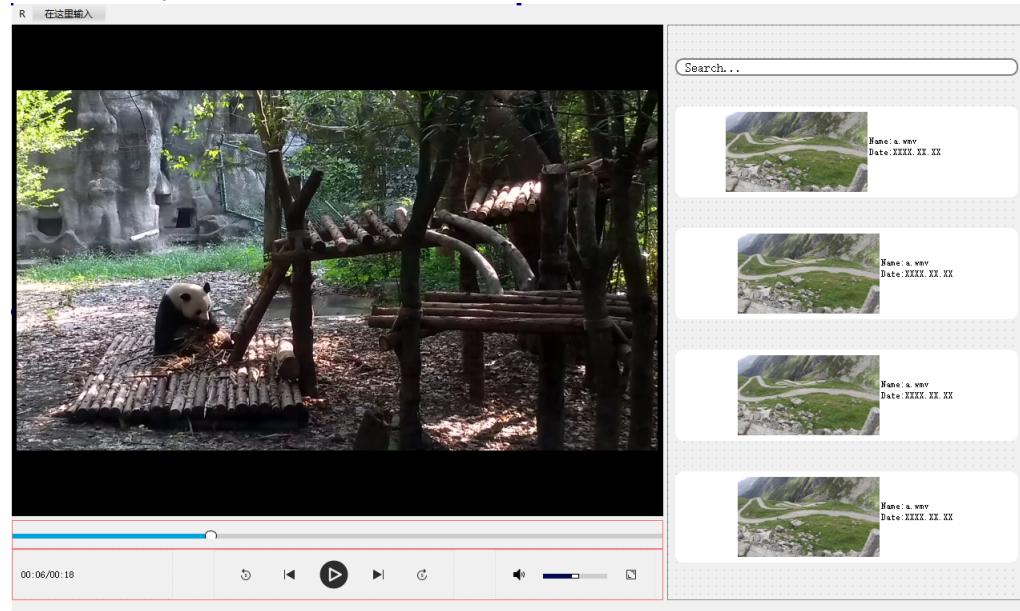
The design motivation for this loop is to give developers an idea of what the player will eventually look like and what it will do. The team stopped consulting and researching the major browsers in the market. Make changes to the player details while ensuring that the functions in the previous loops work properly. Through these efforts to achieve the purpose of more rich player features. The team also tweaked the color scheme in the hope of attracting more users to the player.

#### **8.1.4 The reason for the chosen technique:**

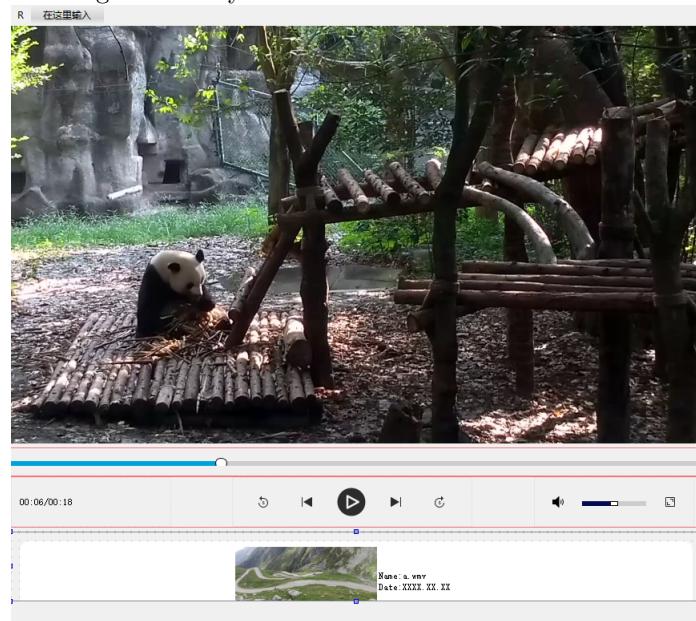
In the last cycle, the team chose the high-fidelity prototype Qt Designer, which is most closely related to real software, mainly because it fits more closely with the developer's development environment. It is highly integrated with the developer's development environment. Helps developers form final documents. In this cycle, the team will pursue the most realistic and realistic prototype design regardless of time and cost. Qt Designer's prototype design environment ensures that the designed prototype is identical in material, color and expression to the software developed by the developer. As the last cycle, it is obviously the right choice to spare no effort to put into the prototype design, so using Qt Designer as the prototype design method is the most appropriate.

### 8.1.5 Evidence of the design:

Horizontal layout



Longitudinal layout



## **8.2 Evaluation:**

### **8.2.1 The name of the evaluation technique used:**

The prototype evaluation method used in this cycle is User Testing. The specific process is as follows:

The final test is carried out through the user's random actual operation.

### **8.2.2 The describing of why this technique was chosen:**

User testing method can obtain the most real user feedback in the actual operation. User testing is the most intuitive assessment method in usability testing, and it is the most suitable one for the final version. According to the user base of the product, the developer selects some representative users and invites these users to do usability testing together. With feedback from users, developers can easily obtain psychological and physical information from users' performance, mood, operational fluency and other details. As evidence for further improvement or finalization of the plan. As a final loop, the user test method can simulate the actual performance of the player when it is finally put into use. Therefore, the user test method is the most suitable evaluation and review method for this cycle.

### **8.2.3 The describing of the outcomes of the evaluation:**

Through user testing, the team obtained a series of test results that showed that users could get the basic functionality they wanted from the player. And most importantly, as a core part of user interface design, users are satisfied or acceptable with the overall color palette of the player. However, there is still room for further improvement. But on the whole, the basic functions of the player can be realized and accepted. Special groups and users with distinctive characteristics are also considered. For example, convenient outdoor operation mode and comfortable indoor operation experience.

### **8.2.4 Evidence of the evaluation:**

## **8.3 Code:**

### **8.3.1 The video illustrating the changes compared to the previous version:**

### **8.3.2 The link to a code repository with the developed code for this cycle:**

### **8.3.3 The describing of any differences between the prototype and the implementation because of the evaluation or technical difficulties:**

In this cycle, the search box in the vertical layout is not reflected in the prototype due to unfamiliarity with how the prototype is used. In the final result, the

vertical layout can also use the search function. In addition, the information display part of the video being played is also slightly adjusted to make the text expression more beautiful.

## **9 Ethics Statement:**

The whole team strictly complied with the regulations related to the study of human ethics. All members and participants of this project are issued the University's Research Participant Privacy Notice as shown in the figure below as a reminder. At the same time, University's Research Participant Privacy Notice is also has legal benefits