# Concept one
## Yu

I started from the analysis of observations from real races and clustered all of those needs of timekeepers into three categories which are highlighted in different colors on the second row of Figure 33.

- **Information management**
- **Convenient operation** (various types of input)
- **Mental support** (various types output as feedback)

To meet those needs, I intended to focus on devising embodied interactions (other than digital interactions, such as gesture controls). The post-its on the third row show some corresponding design solutions.

Specifically speaking, there are 9 interactions concepts which can be applied to different scenarios:

1) Quick mode switching by one click
2) Use volume button as an input
3) Live chat box
4) Turning the direction of phone as a trigger
5) Vibration feedback
6) Shake to undo
7) ProbUI [5]

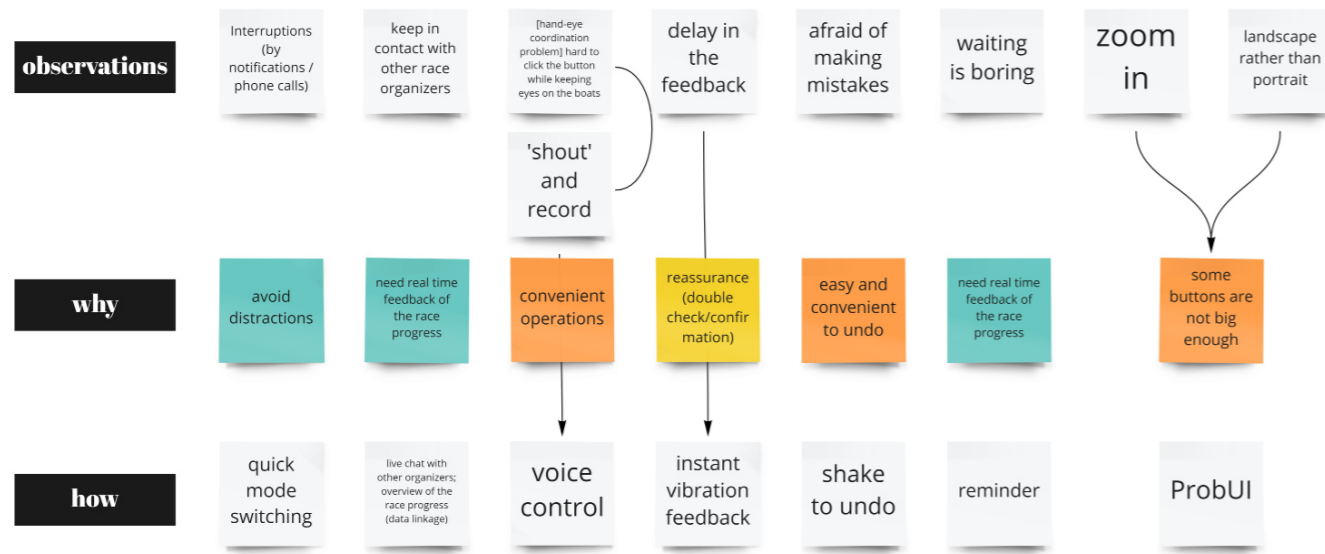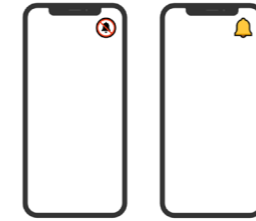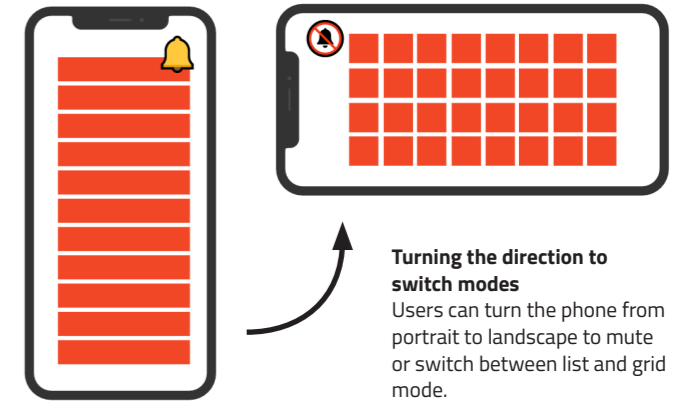| observations | Interruptions (by notifications / phone calls) | keep in contact with other race organizers | [hand-eye coordination problem] hard to click the button while keeping eyes on the boats | delay in the feedback | afraid of making mistakes | waiting is boring | zoom in | landscape rather than portrait |
|---|---|---|---|---|---|---|---|---|
| | | | 'shout' and record | | | | | |
| why | avoid distractions | need real time feedback of the race progress | convenient operations | reassurance (double check/confir mation) | easy and convenient to undo | need real time feedback of the race progress | | some buttons are not big enough |
| how | quick mode switching | live chat with other organizers; overview of the race progress (data linkage) | voice control | instant vibration feedback | shake to undo | reminder | | ProbUI |

**Figure 33** *From observations to solutions*

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**Quick mode switching**
Users can mute all notifications just by clicking one button on the home screen.

**Turning the direction to switch modes**
Users can turn the phone from portrait to landscape to mute or switch between list and grid mode.

**Volume button**
Users can press the volume button to record time besides using the digital button. When the phone is held vertically, pressing the volume button will also activate the camera fto take a photo as a backup when the time is pressing.

**Live chatbox & synchronized data**
Users can use the floating chat box to keep in touch with other timekeepers to be informed of the progress of the race. Data on different terminal devices is shared and synchronized.
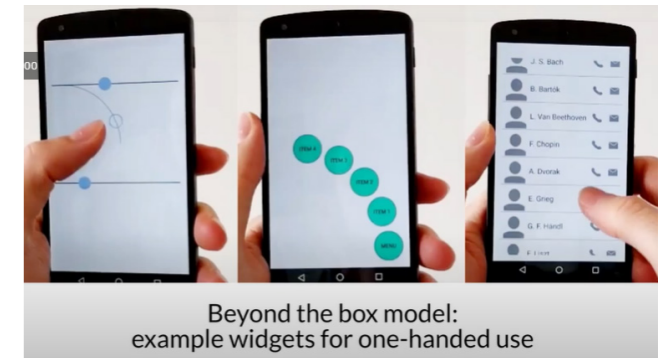


Beyond the box model:
example widgets for one-handed use

**ProbUI**
ProbUI is a mobile touch GUI framework, implemented as an Android library. It helps developers to handle uncertain input and implement feedback and GUI adaptations. ProbUI replaces the usual static target models (bounding boxes) with probabilistic gestures ("bounding behaviours") [4].

**Vibration feedback**
To ensure the users that certain task has been accomplished, vibration will be used as a haptic feedback.

**Shake to undo**
To quickly undo, users can shake the phone and redo.

**Voice-activated recording**
The time can also be recorded automatically when detecting certain sounds (shouts).

**Figure 34** *Explanation concept Alena*

# Concept two

## Anna

The first step within creating concepts was to clearly visualize what types of buttons and functions were available. As mentioned before we clearly see that buttons and functions are not well organized (Figure 35 & 36), there is no clear structure and hierarchy.
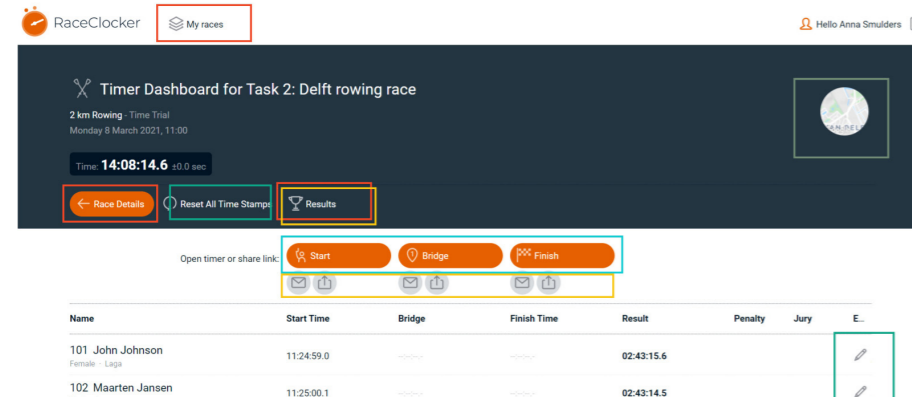


**Figure 35** *Timer dashboard*

Within the race preparation hierarchy was missing, most importantly a navigation bar is added which helps to give the user overview within their use flow (Figure 37). When uploading participant lists, it is important that the possible functions are clearly visible. Also feedback with color coding is used in order to communicate and visualize the race process during the race (Figure 37).
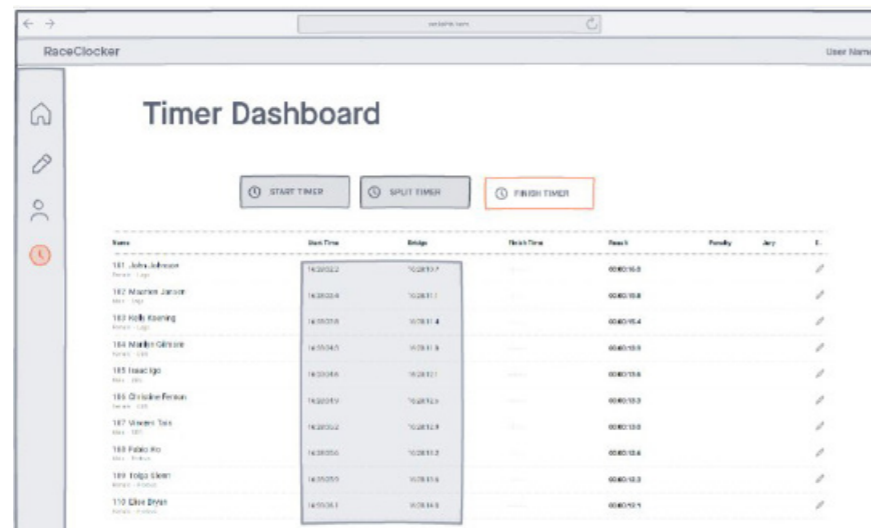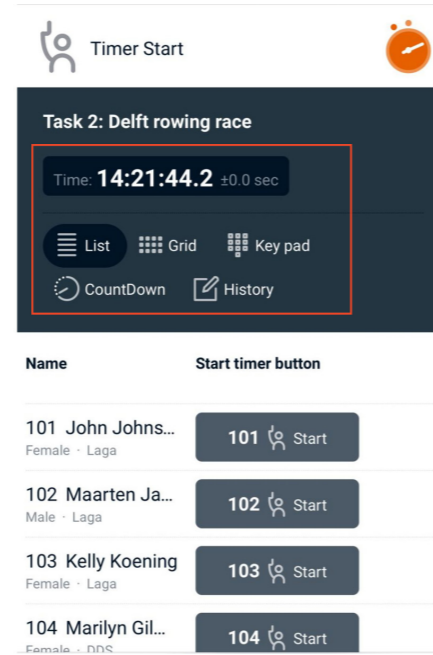


**Figure 37** *Concept timer dashboard*



**Figure 36** *Start timer*

Timekeepers get a much cleaner interface, a lot of information currently takes in a lot of space which is not necessarily important. Therefore more focus will be shown to the buttons needed to track times. Different pages will be limited only to a grid and list interface (Figure 39 and 40). This concept allows for prepared timing, one can first select a participant and then assign a connected time or the other way around (Figure 38). First time, and then assign a participant to this time. Also two step timing is possible within the same interface through the use of a long press.
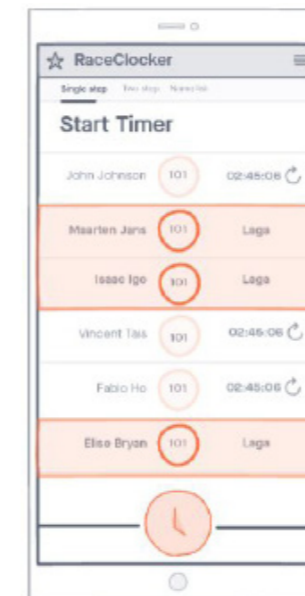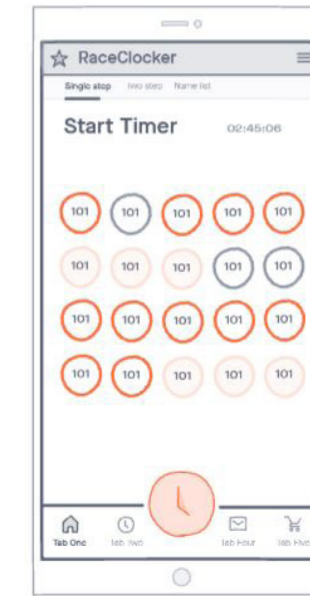
**Figure 38** *Two step timing*
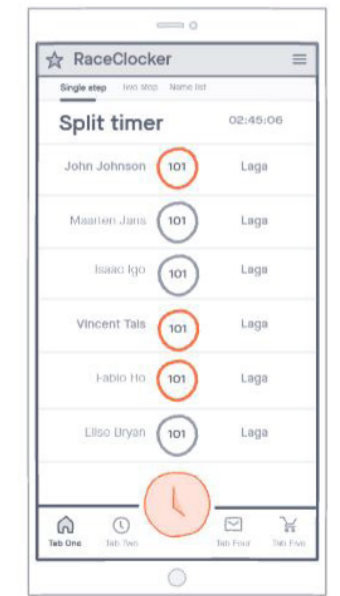
**Figure 39** *Start timer*

**Figure 40** *Split timer*



56

57

# Concept three

## Maureen

### Hierachy

Within my concept ideation I started with defining and structuring the current elements of RaceClocker's interface. Figure 41 shows three categories in the current hierarchy: **information** (blue), **functions** (red) and **navigation** (yellow). They are all over the place in each different interface, not ordered logically which makes it more difficult for the user to find the right element. In my concept I structured these three categories and arranged them in different ways with the same colour codes as mentioned before (Figure 42).
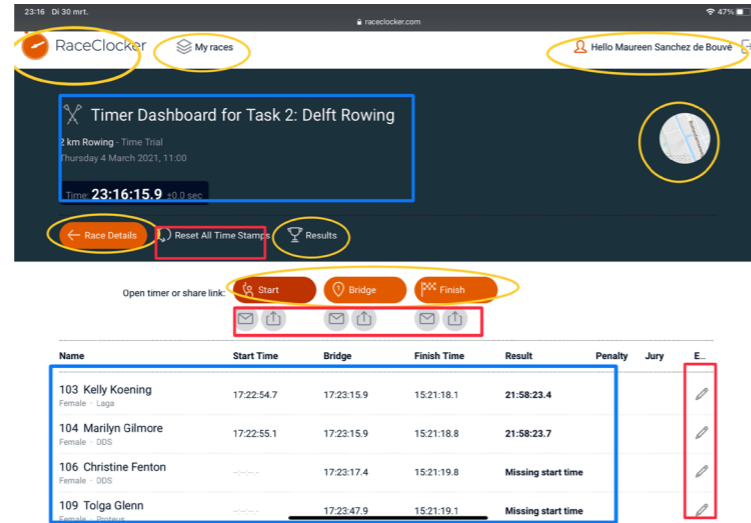


**Figure 41** *Current hierarchy of RaceClocker*

## Dimensions

When voluntarily timing a rowing race, my hardest struggle was to divide my focus on three dimensions at a time (Figure 43). Therefore, a simple but effective solution is to provide the time keeper two ways of timing. First pressing the time, then assigning the right participant and the other way around. This way of timing, together with a larger timing button and a simple and clean screen, is the focus of this concept.
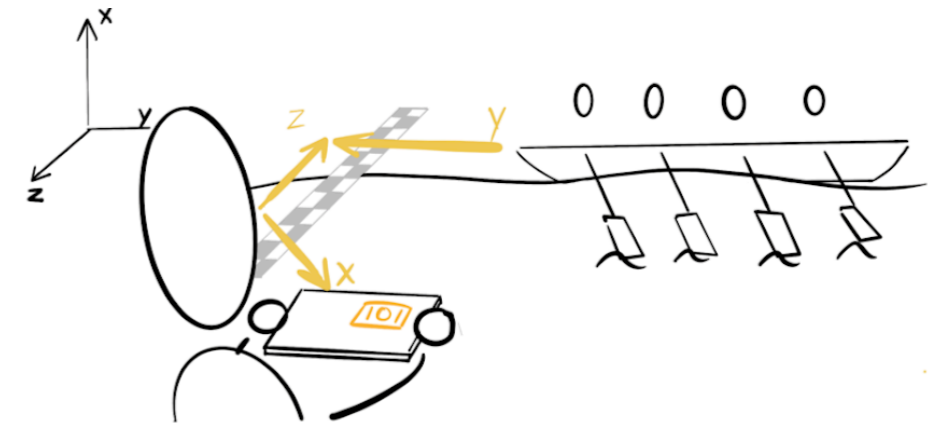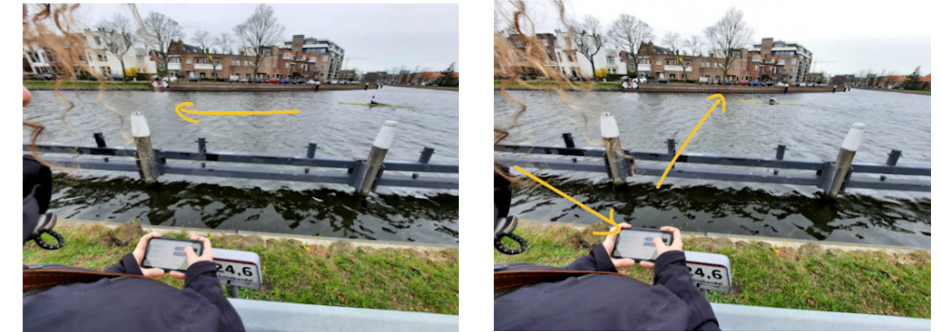


**Figure 43** *Race Experience with dimension y (which boat is approaching), dimension z (boat is passing the line) and dimension x (the right digital timing button needs to be pressed)*



< **Figure 42** *Organising the hierarchy of RaceClocker*

# Concept four

## Saki (Shunqi)

The timekeeping page is redesigned in a more visual way. The participants are shown as bubbles. A noticeable "finish line" distinguishes the finished and unfinished participants.

### Welcome page

When the timekeepers open the link, they will first get an overview of the race info, which can help them check if they are in the right place.

### Prioritization

60

The timekeeper needs different information at different stages. For example, bib number is the only information needed for recognising the approaching participant. By tapping the bubble, it will get bigger and move to the front of the list. Then the name of the participant will also be shown on that bubble for double checking if this is the right participant. In this way, the approaching participants are prioritized. When the participants are passing by, the time can be registered by tapping their representative bubbles. After that, the bubble will move over the finish line. And it will include more information, such as the passing time.

### Data linkage

The timing data of split point 1 will be transferred to the timekeeper at the next split point. In other words, participants are not ordered by their bib numbers, but by their passing time at the previous timing point.
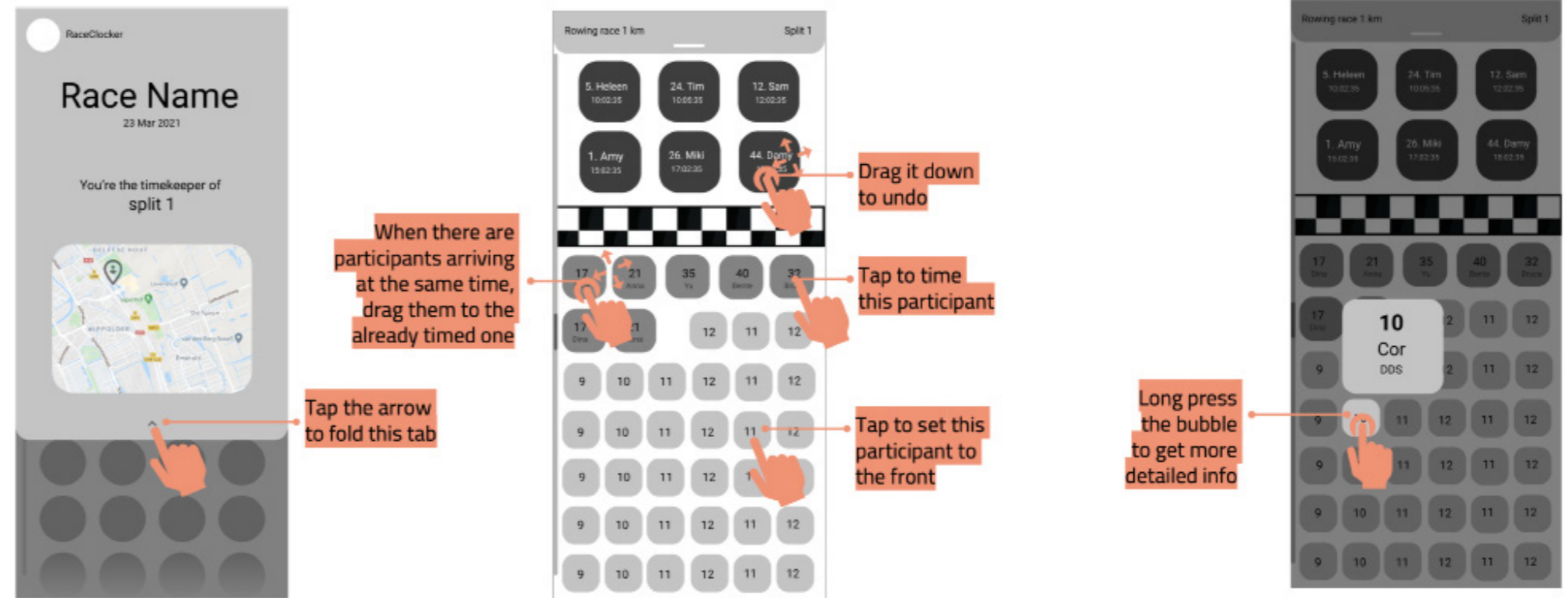
### Gesture control

A lot of conventional gesture controls are added to prevent accidental touches. They are explained in Figure 44.

**Figure 44** *Interfaces of concept*



61

# Concept five

## Shuyue

Based on the insights from the observation and the aim to connect the digital and physical world, I developed my design according to the different steps of the races and select two of the points which are most significant in the real race.

FIrst, I set the design goal and interaction vision (Figure 45) and reframe the architecture (Figure 46) of the RaceCocker to have a more clear and consistent hierachy.

**Design Goal**

How to make timekeeper have **precise control** of time while mobilizing his **multi-sensory behavior**

**Interaction Vision**



Accurate card rhythm
Listening and moving synchronization
Collaboration with other

A **skilled** tap dancer ddances

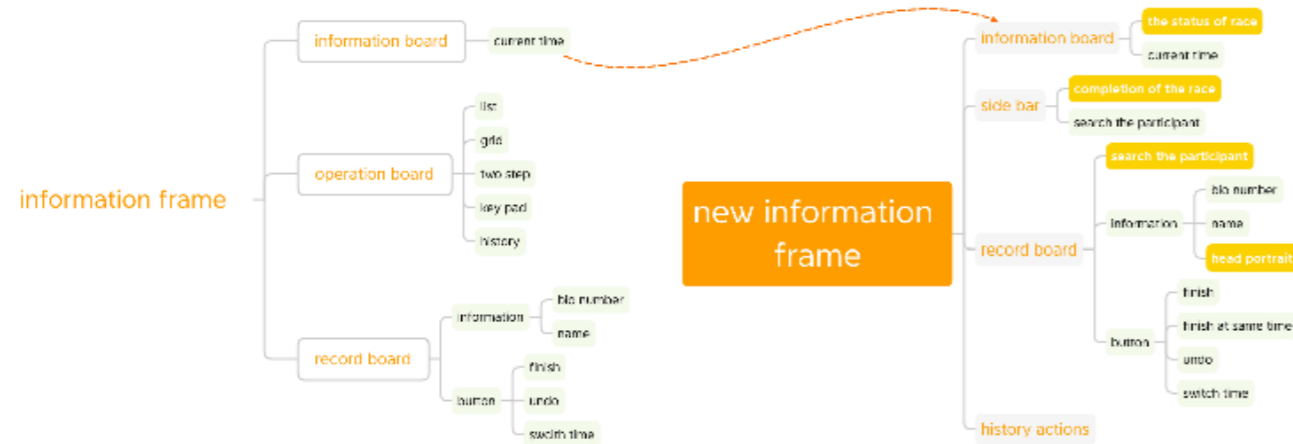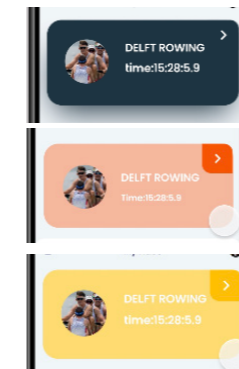**Figure 45** *Design goal & Interaction vision*

**Figure 46** *Information frame*

Based on the interaction vision and architecture, there are two design points that I focus on:

## 1. The different race status

## 2. Recording

### Color change
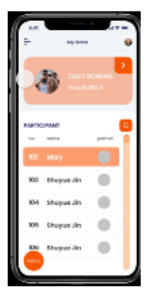Different colours represent virous status of the race to give managers and time keepers obvious reminders.



### Record for one participant
When there are only one participant approaching the end point, users can record by two steps.
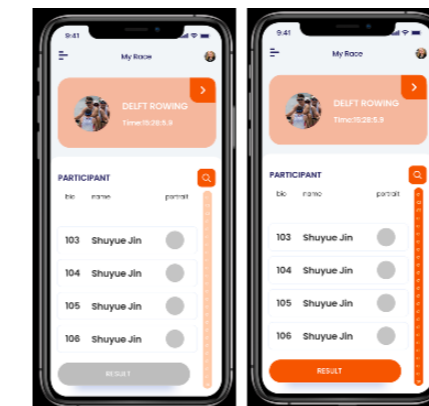


*1. When the participant is close, select the participant in advance*

*2. Record the time without seeing the phone.Phone will vibrate if the time is recorded*

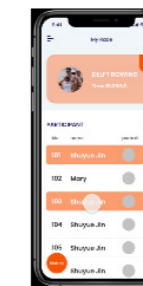*3. App will select the next participant*

### Side bar
Use a side bar to show the process of the race and help keepers know it efficiently and intuitively.



### Record for multiple participant
When there are multiple participant arriving at the same time, these groups of buttons can  be used to fit the various situations.



*1. When observing two participants , select them in the same time*

*2a. If they arrive at the same time, pressing volumn button  to record  the time.*

*2b. If they arrive in different time, pressing volumn button and lock screen button.*