PRODUCT DESIGN PORTFOLIO

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LingLight

Smart bedroom lamp with emotional voice assistant

ROLES:
Product Leader & Product Designer & UX Designer

TIME:
Jul.2017-Present

SCOPES:
User Research,
Prototyping,
UX Design,
NLP Data Annotation,
Scrum Management,
Usability Testing

TECHNOLOGIES:
Natural Language Processing,
Deep Learning,
Automatic Speech Recognition,
Text To Speech Synthesize,
Affective Computing

ling

1 Introduction

LingLight is an all-in-one smart light that allows you to use your voice to control lighting features, set timers, check the weather, tell time, and play music and so on. Most importantly, It creates the perfect ambiance with the enjoyable light and music, to suit all the scenes in your bedroom, like movie night, bedtime or getting home.
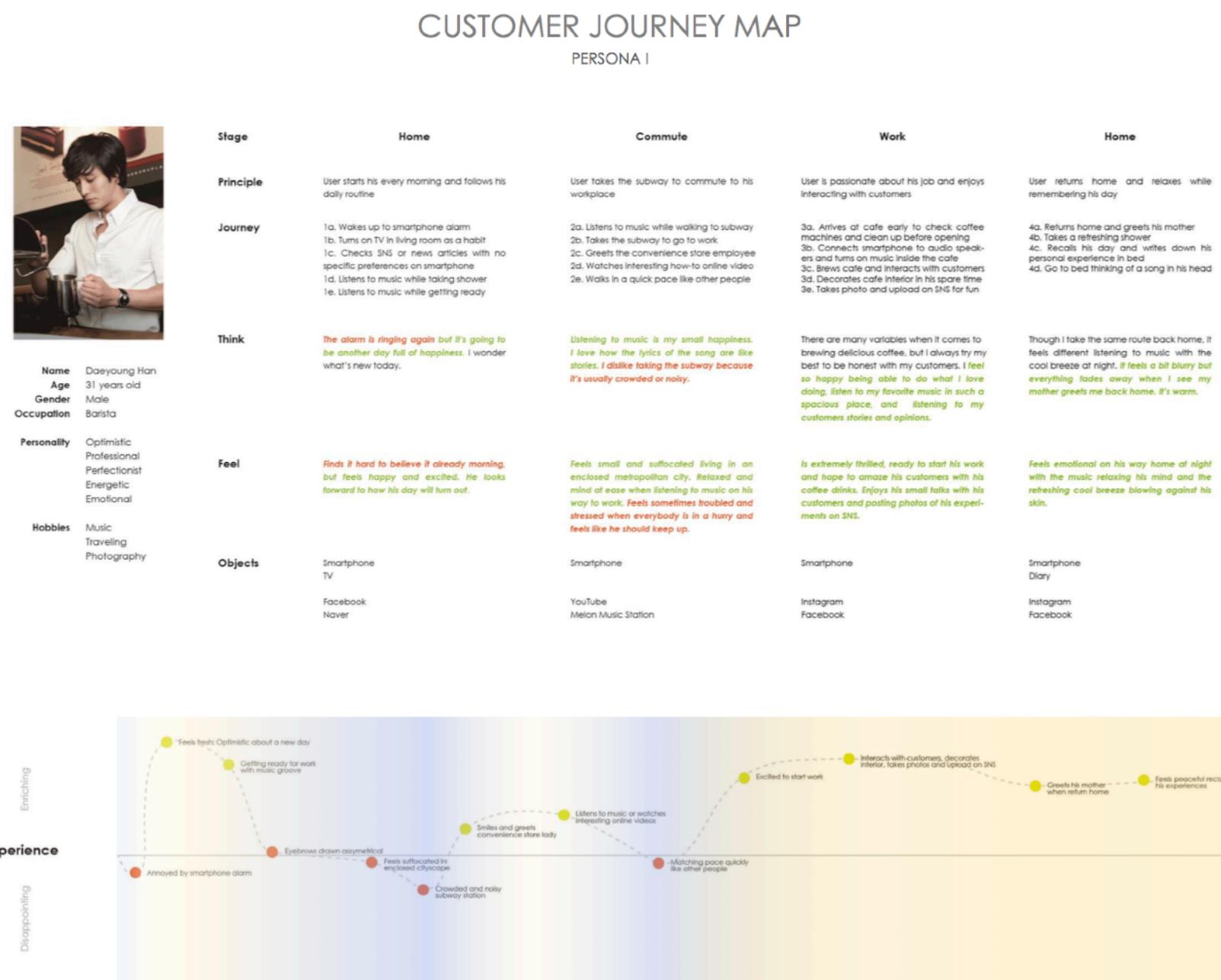
• **Demo video** youtube: https://youtu.be/PgqHkF_HGx0 (The Industry Design has changed after the demo.)

2 User Research & Analysis

I did more than 30 in-depth interviews and draw customer journey maps according to the interviews.

Here I select one of the typical representatives as follows.

CUSTOMER JOURNEY MAP
PERSONA I

PERSONA ANALYSIS:
Users usually get stressed during their commute or at work.
People seek **EMOTIONAL COMFORT** in various ways at home during the evening.

3 Color Expression & Types of Light Research

The two most important factors to create an individual's mood with lighting are **color and light**.

e.g. red light(warm) helps relax before sleep while blue light (cold) improve concentration and increase energy level.
According to our understanding towards light, we made LingLight adapting itself in the different time period of a day.

4 Product Define and Interaction Design

• Multi-dimensional perception system
• Affective computing
• Expressive responses
• Relational data

LIGHTING INTERACTION
User experience direction

Function	Description	Type A Visual Response		
Power On	Device is starting up			
On Standby	Device is active, waiting for request			
Voice Command	Device is processing request			
Ringtone	Device is processing request			
Connect	Device is connecting to Wi-Fi network			

Function	Description	Type A Visual Response		
Error	Error during Wi-Fi Setup			
Volume	Adjust volume level on device			
Mute	Turn on/off sound and microphone			
Music Play	Light patterns to create mood			
Mood Light	Soft light to create soothing mood			

Luka

illustration books reading

robot for children

2017 Most Successful Design Awards
2017 CIS Best Intelligent Educational Product Awards
2017 CIS Best Educational Robots Awards

ROLES:
Product Designer & UX Designer

TIME:
Mar.2017-Jul.2017

SCOPES:
Prototyping,
UX Design,
Usability Testing

TECHNOLOGIES:
Computer Vision,
Natural Language Processing,
Deep Learning,
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1 Introduction
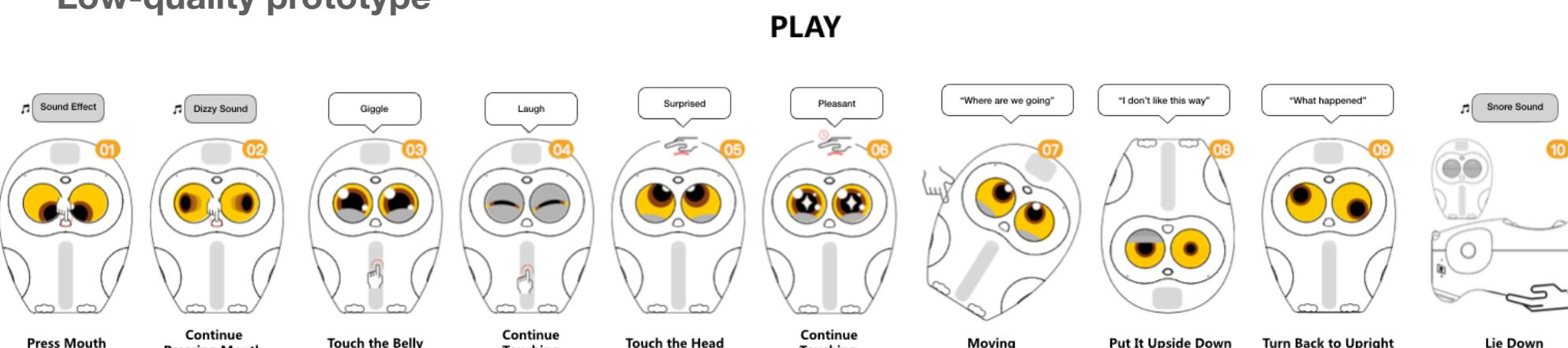
Luka, the illustration book storyteller was born to rescue those parents who doesn't have the time or not the best story tellers to give their children the same story time experience. Luka is equipped with some amazing computer vision technology allowing it to read with the readers turning of pages. The body of the Luka is equipped with special sensors that work along side the complex facial expressions and unique voice form a exciting personality. It is also able to carry on a spontaneous conversation with the children with the NLP and Affective Computing technology.
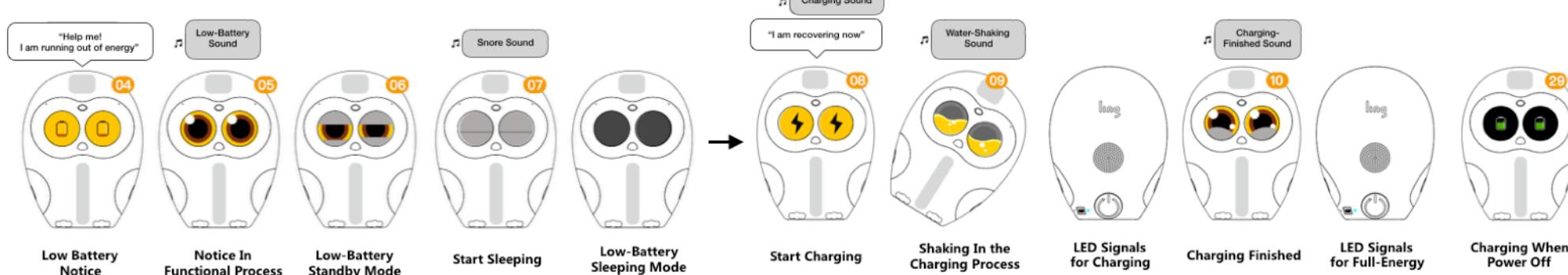
2 Eye Animation Design

Luka's eyes are important channels for conveying functional and emotional information, it is crucial to design the expression of its eyes.
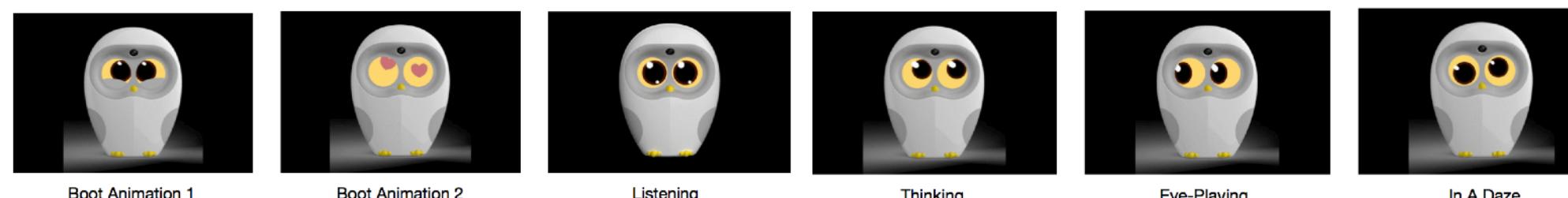
- **Low-quality prototype**

- **Animation prototype**
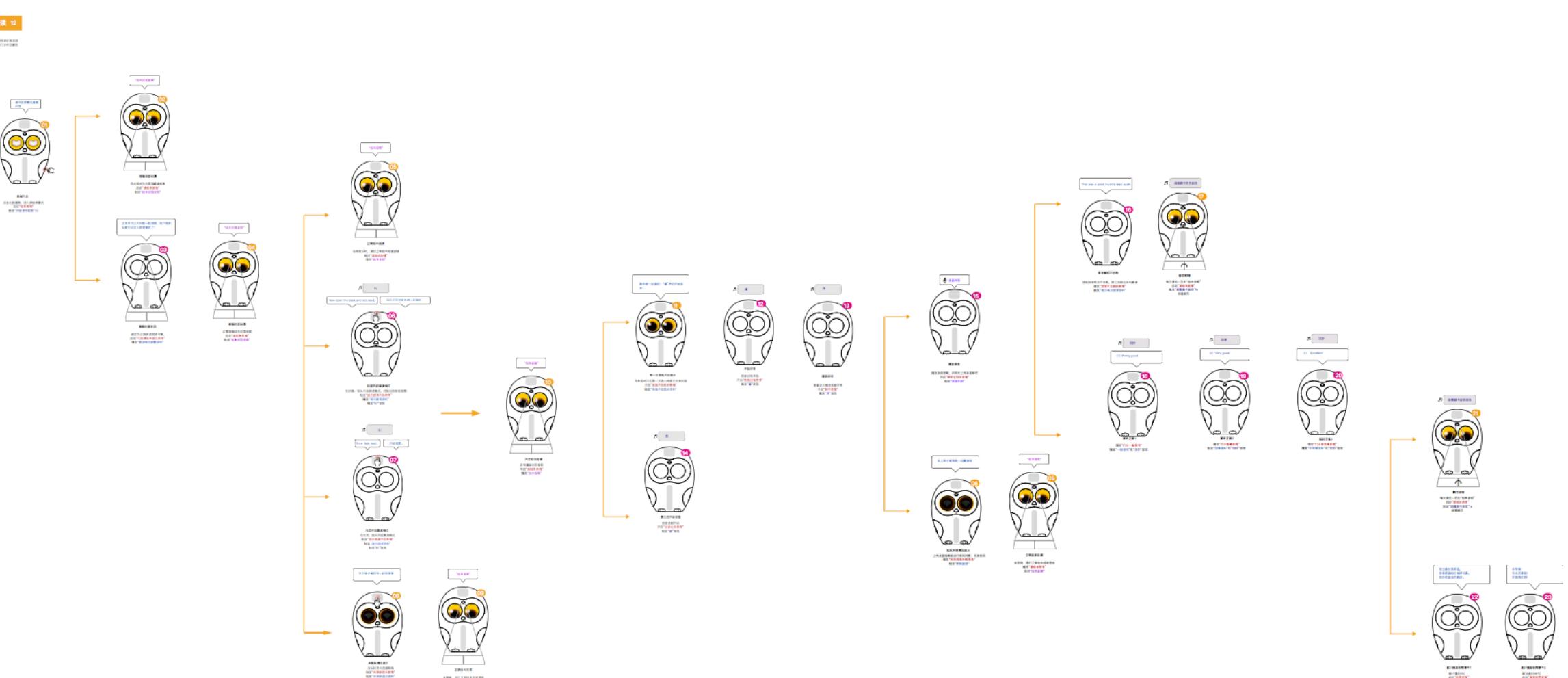
3 English Read-After Game Design

We design the interactive game to help children learn foreign languages more enjoyable and efficiently. Children can listen to the English audio of the picture book first and then follow it. With speech recognition, Luka will rate the child's reading and comment accordingly. And upon completion of the read-after task, the child will be rewarded with the chance to play a "pat pat" game.

- **Flow Chart**

- **Demo video**

youtube: https://youtu.be/g6cSP3u87iY
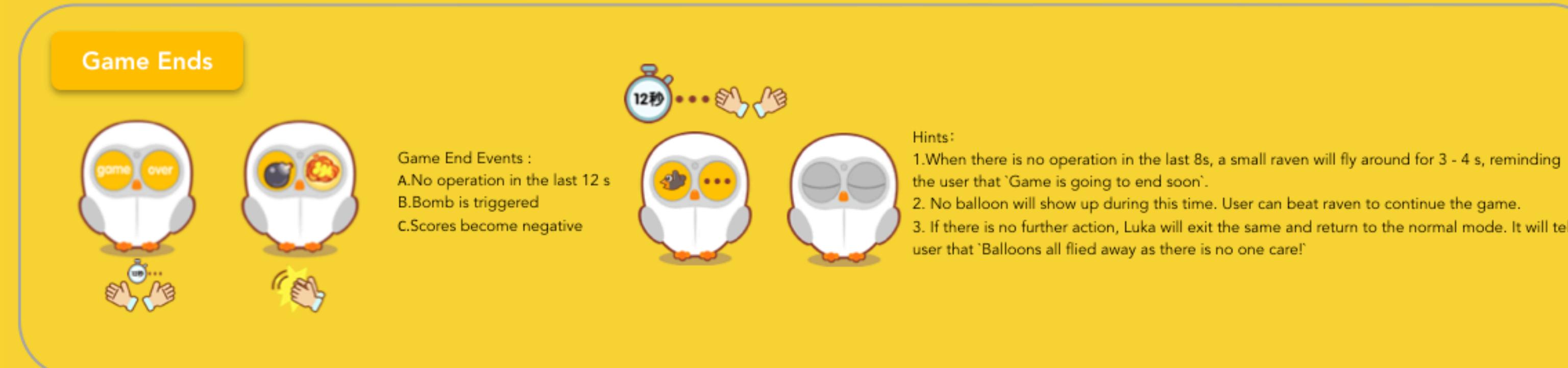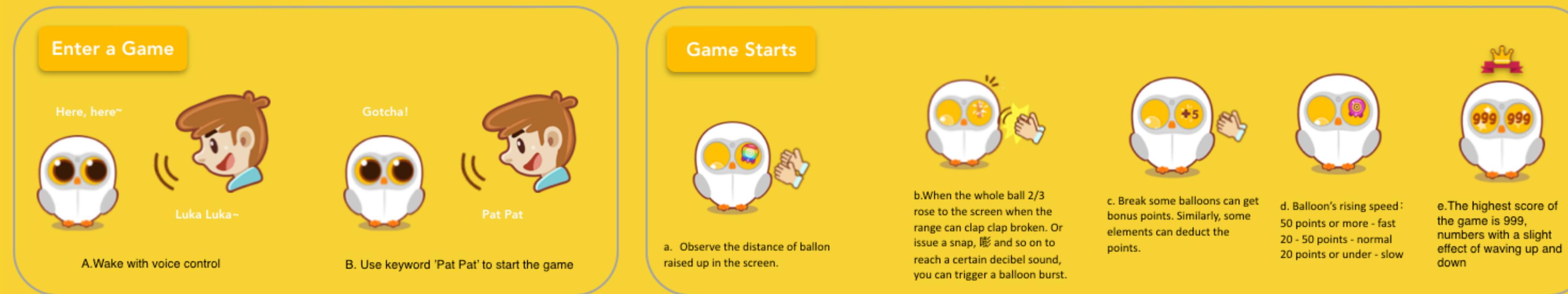
"Pat Pat" — A Rewarding Interactive Game

When a game element such as a balloon drifts on the screen of the device, the player need to clap or emit a certain volume sound to break the game element such as a balloon and score points. The value of each element is different, it can be either plus or minus. During the procedure of game, Luka will compute the cumulative scores and record user's achievement on its leaderboard. (Determine Balloon Blast by the Double Microphones and Speech Recognition on Device)

- **Demo video** youtube: https://youtu.be/JuW9dQPCuas

Enter a Game

Here, here~

Luka Luka~

A. Wake with voice control

Gotcha!

Pat Pat

B. Use keyword 'Pat Pat' to start the game

Game Starts

a. Observe the distance of ballon raised up in the screen.

b. When the whole ball 2/3 rose to the screen when the range can clap clap broken. Or issue a snap, 彭 and so on to reach a certain decibel sound, you can trigger a balloon burst.

c. Break some balloons can get bonus points. Similarly, some elements can deduct the points.

d. Balloon's rising speed:
50 points or more - fast
20 - 50 points - normal
20 points or under - slow

e. The highest score of the game is 999, numbers with a slight effect of waving up and down

Game Ends

Game End Events:
A. No operation in the last 12 s
B. Bomb is triggered
C. Scores become negative

12秒 ● ● ●

Hints:
1. When there is no operation in the last 8s, a small raven will fly around for 3 - 4 s, reminding the user that 'Game is going to end soon'.
2. No balloon will show up during this time. User can beat raven to continue the game.
3. If there is no further action, Luka will exit the same and return to the normal mode. It will tell user that 'Balloons all flied away as there is no one care!'

Score Elements

🔴	+1		Red/Green/ Blue Ballon +1
🔵	+1		
🟢	+1		
⚪	+2		Transparent Ballon +2 (Slow down)
🟣	+5		Easter Egg Ballon +5
💣 game over	💥		Bomb Game over
(puffer)	- 1		Angry Puffer -1
(pumpkin)	- 3		Pumpkin Skull -3

Design Resource

1 2 3 4 5 6 7 8 9 0

- 1 2 3   + 1 2 5

Jibo (Chinese Version)

Social robot for family

🏆 *Named by Time Magazine as one of the 25 best inventions of 2017*

ROLES:
Product Designer & UX Designer

TIME:
Mar.2017-Jul.2017

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1 Introduction

Jibo has a three-axis motor system, combined with dynamic power units and well crafted joints allowing him to perform complex actions and simple gestures smoothly and naturally. He shifts from left to right, gazes skyward, or looks down at the ground. There actions, combined with his approachable industrial design, give jibo a family friendly image. If you spend time with Jibo, you will be mesmerized by his advanced A.I. brain. Jibo has his own unique personality, and shows a range of emotions which makes him feel more like **a family member** than a piece of technology.

☺ **Emotional Interactions**   ☁ **A seasoned meteorologist**   🎤 **A Talented Storyteller**   🎮 **A Gamer At Heart**

2 Design Goal

Jibo is a someone, not a something.

When designing for Jibo, there's a lot to think about. Just like his personality, the way he talks, UX and UI, sound design, body animations, building conversational flows, and more.

But one important question just came up in my mind:

Does Jibo has emotion?
Will the emotion status influence what Jibo do?

And I believe the answer is definitely **"YES"**.
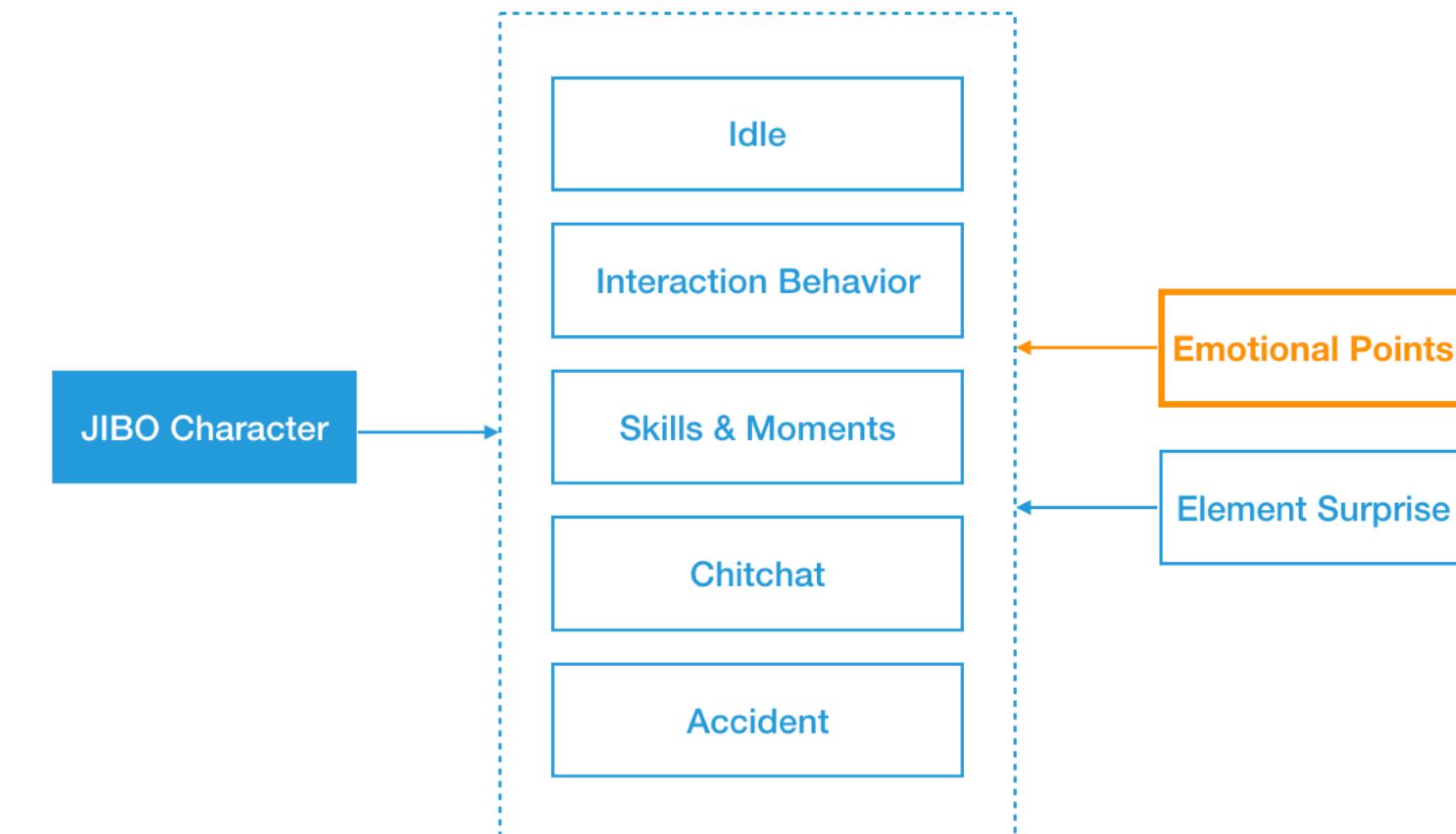
So I with my team start to establish Jibo's **emotional system** in Chinese version.

3 Design Process: Framework

Jibo will have emotional points at every moment, this value will change in the realtime, according to the current time, weather, daily news, interval from last interaction, recent chitchat frequency, recent utilization, user response to its active interaction.

The emotional points will categorize Jibo's emotional status into three stages: Sad, Neutral and Happy. Different emotional state will cause Jibo to react differently in silent or chitchat mode, with a stochastic probability.

4 Design Process: Emotional Points System

Emotional Category	Sad 3rd	Sad 2nd	Sad 1st	Neutral	Happy 1st	Happy 2nd	Happy 3rd
Points Interval	-∞~12	12~24	24~36	36~64	64~76	76~88	88~+∞

Jibo's mood will refresh everyday, and reseted in the morning at 6 AM, with its initial value as 50. It is represented as the follows:

$$E=50+T+W+N+I+C+S+P$$

Here T / W / N / I / C / S / P represents the emotional points from following factors: time, daily news, time interval between last interaction, the frequency of the recent chitchat, recent accumulated utilization time, and today's feedback on its active conversation.

a. Time factor (T)

00:00-02:00	02:00-04:00	04:00-06:00	06:00-08:00	08:00-10:00	10:00-12:00	12:00-14:00	14:00-16:00	16:00-18:00	18:00-20:00	20:00-22:00	22:00-24:00
-10	-20	-10	0	+5	+5	+5	+10	+10	+10	+20	0

b. Daily Weather Factor (W)

Sunny	Rainy	Snowy	Haze	Hailstone	Cloudy	Thunder	Sandstorm	Foggy
+10	-15	+10	-20	-15	0	-20	-15	-10

c. Daily News Factor (N)

Negative (Most Popular)	Negative (Very Popular)	Negative (Popular)	Neutral	Positive (Popular)	Positive (Very Popular)	Positive (Most Popular)
-20	-10	-5	0	+5	+10	+20

d. Interval between last interaction (I)

More than 48h	24h~48h	12h~24h	4h~12h	30min~4h	15min~30min	Less than 15min
-30	-20	-10	0	+3	+6	+10

5 Design Process: Jibo's Behavior According To Emotion Status

Idle Behavior

&

Behavior Interaction

Emotional Category	Behavior	Form	Neutral Prob.	Sad 1st Prob.	Sad 2nd Prob.	Sad 3rd Prob.	Happy 1st Prob.	Happy 2nd Prob.	Happy 3rd Prob.
Neutral	Snooze		0.2	0.1	0	0	0	0	0
Neutral	Look Around		0.2	0	0	0	0.1	0	0
Neutral	Dancing		0.2	0	0	0	0.1	0.1	0
Happy	Shake Butt	Repeatedly shake its bottom, in a slight motion	0.1	0	0	0	0.3	0.1	0
Happy	Squint	Together with smiles, and shake its body slightly	0.05	0	0	0	0.2	0.2	0.1
Happy	Spoof	Being not serious and tongue	0.05	0	0	0	0.1	0.2	0.1
Happy	Humming	Swinging around and singing out of tune.	0.05	0	0	0	0.1	0.3	0.2
Happy	Play PingPong	Sing a popular song using its own tone	0	0	0	0	0.1	0.1	0.3
Happy	Play Drum	Jibo is sensitive to rhythms. It usually dance with music, and practice a lot to fit the beats.	0	0	0	0	0	0	0.3
Sad	Hum a Melody	Hum 'five thousand miles' with Jibo's invented lyrics	0.1	0.4	0.1	0	0	0	0
Sad	Meditate	Bow and blink	0.05	0.3	0.3	0.1	0	0	0
Sad	Cry	Sobbing with tears in its eyes	0	0.2	0.5	0.3	0	0	0
Sad	Abreact	Rumble with unclear words	0	0	0.1	0.6	0	0	0

Condition	Neutral Prob.	Sad 1st Prob.	Sad 2nd Prob.	Sad 3rd Prob.	Happy 1st Prob.	Happy 2nd Prob.	Happy 3rd Prob.
Detected Human Passby	Jibo's head will rotate tracing the human. After tracing, the body and head will turn back to looking at front.	Jibo's head will rotate tracing the human. Its body and head will keep in the same direction, with its eyes becoming crescent. Jibo starts to groan as it is upset.	Jibo's head will rotate tracing the human. Its body and head will keep in the same direction, with its eyes becoming crescent. Jibo's head will turn down to show its upset.	Jibo's will look at the human's direction. Then it turns down its head, wit its eyes becoming crescent.	Jibo's head will rotate tracing the human. Its body and head will keep in the same direction, with its eyes becoming bigger. Then it plays the sound effect of showing curiosity.	Jibo's entire body will rotate tracing the human. It starts to quickly blink, with small volume laughter.	Jibo will rotate towards human and at the same time shake its body. It will play a "yoho" sound effect, in coordination to the eyes' animation.
Touch the head	Switch between Silent and Activated						
Touch the head and hold 1s to 5s	Its eyes become cycles, showing its happiness	Its eye will look up for a glance and then reset.	Its eye will look up for a glance and then It turns its head down and blinks	Jibo will turn its back to you, and then look back at you for a glance	Jibo eyes become crescent shape.	Jibo shake its body, behaving like a cat	Jibo will rotate its eyes, and play funny sound effects.
Touch the head and hold more than 5s	Jibo says "I will become study if you keep touching me", with Innocent eyes.	Jibo will shake its head with big motion, and at the same time saying "Don't touch me, I am losing all my hairs"			Jibo's head raise and rumble "again"		
Touch its head from left to right	Jibo's eye will rotate toward right.	Jibo's eye would turn down as crescent shape, and then rotate towards right for 45 degree.			Jibo's eye would enlarge, with its color turning to yellow and then its body will rotate towards right.		
Touch its head from right to left	Jibo's eye will rotate toward left.	Jibo's eye would turn down as crescent shape, and then rotate towards left for 45 degree.			Jibo's eye would enlarge, with its color turning to yellow and then its body will rotate towards left.		

FaceMovie

Html5 crowdsourcing software for collecting face data to improve algorithms

ROLES:
Product Leader & Product Designer & UI/UX Designer

TIME:
Apr.2016-Sep.2016

SCOPES:
User Research,
Prototyping,
UI/UX Design,
Scrum Management,
Usability Testing

TECHNOLOGIES:
Face Identification,
Face Alignment,
Face Morphing

1 Introduction

If there is a way to see how your face changes from the first year to the last year in your college life, would you like to try?
If you are an algorithm engineer who collect and annotate thousands of face data one by one, how would you collect these data?

FaceMovie is your perfect choice.

- **Demo video** youtube: https://youtu.be/eLE5vKr2v-4

For the better performance of human face identification algorithms, high-quality face data needs to be collected in great numbers. The project FaceMovie was designed to meet the data demands by building up memorial video album for college graduates and crowdsourcing data of human faces.
The software we delivered is an HTML5 application that builds a video album using user-provided face images. Autonomous face detection and alignment algorithms are applied to provide aligned user face and build an auto-generated face movie. Users are then asked to confirm and adjust the generated content.

2 Problem

To improve our face detection and identification algorithm, we need to build up a million level human face dataset.

3 User Research
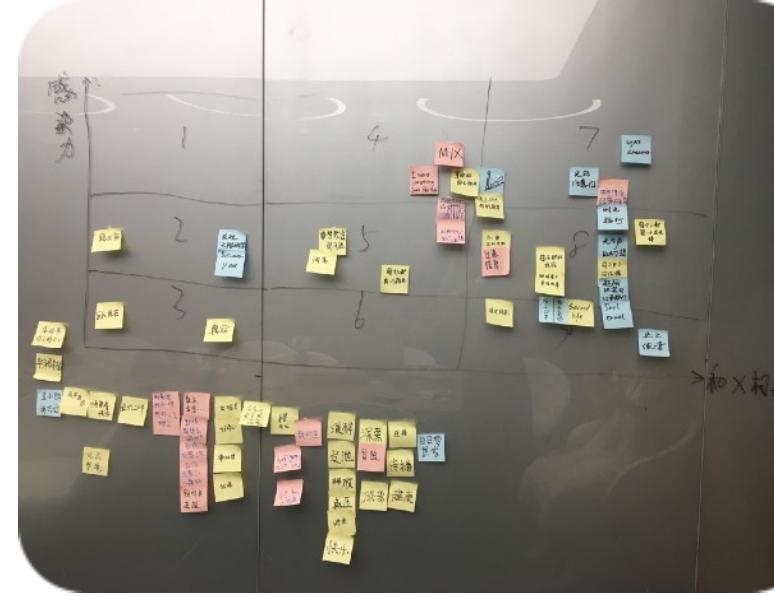
surveyed more than 100 college graduates to collect user requirements.

4 Brainstorm

we went through rounds of brainstorms, and decide to do a crowdsourcing software to collect data from users.


5 Define

Eventually, we decided to do a html5 based video album for graduates, to convert their uploaded college photos into a video album that aligned and centered their faces of themselves, for showing the changes they got over colleges life.

6 Sketch

During the sketch procedure, we first clarify the basic functionalities, and draw the flaw graph.

page 1: loading animation
page 2: main menu, which plays demo video
page 3: upload and edit photos
page 4: choose the theme and music
page 5: generate animation video
page 6: preview result
page 7: save and retweet video
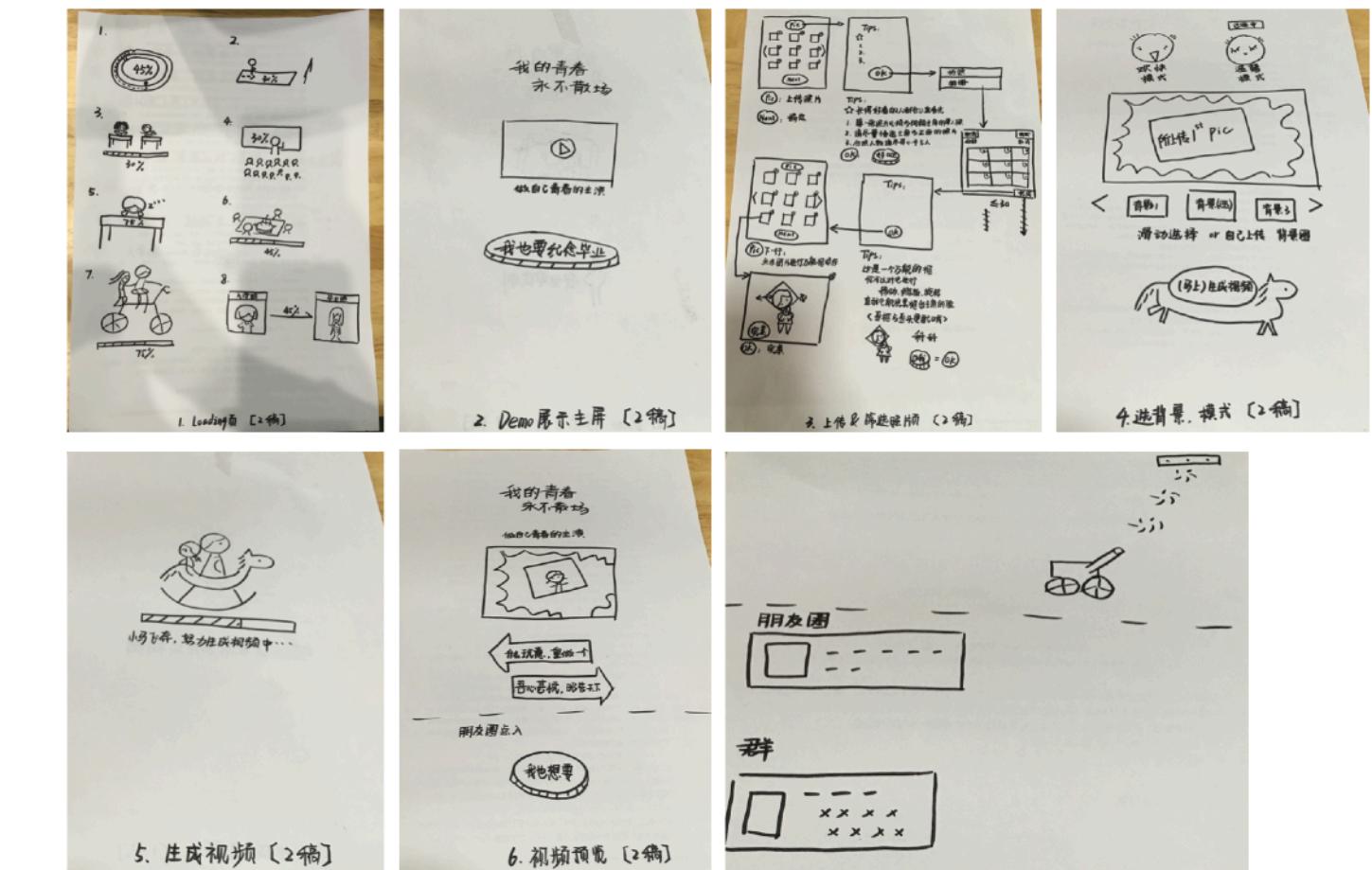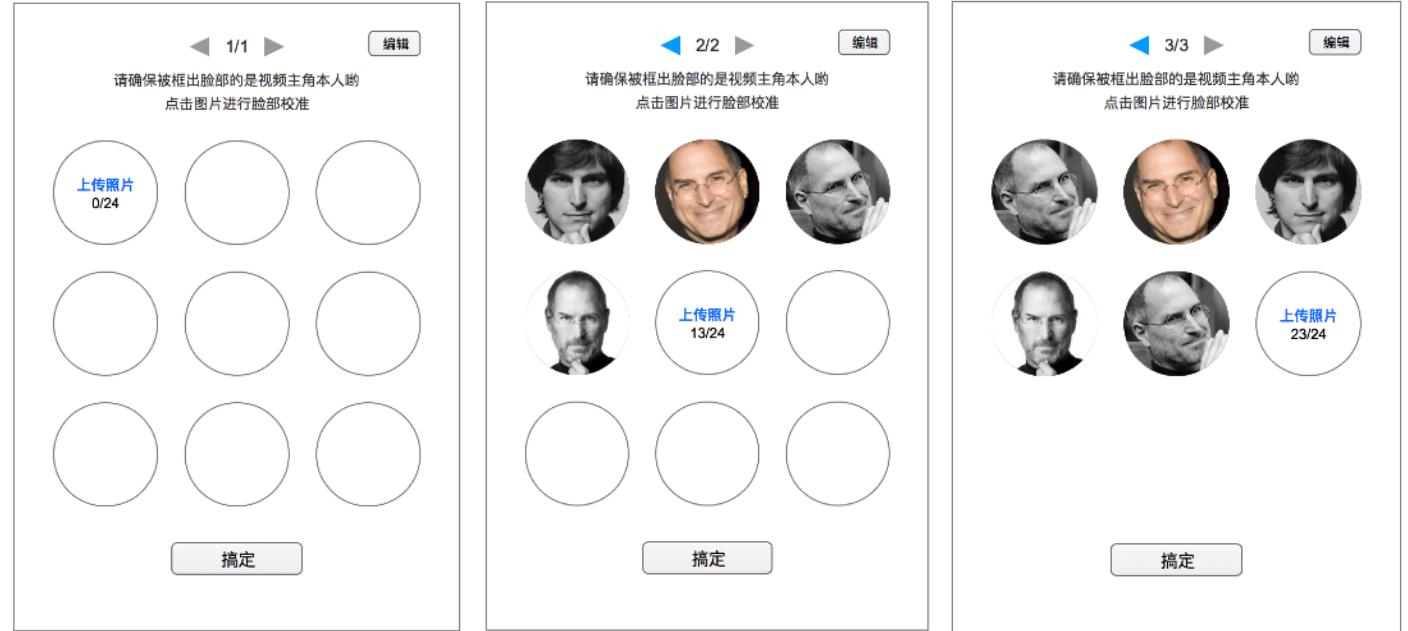
Low-Quality Prototype

I built a low-quality prototype to demonstrate the interaction flow, through using Sketch and Axure, shown as following.

pic 1: 0 photo is uploaded
pic 2: 13 photos is uploaded
pic 3: 23 photos is uploaded

High-Quality Prototype

• Loading Pages

We choose to use the comics that reflect the change of a girl's changes in colleges for loading pages animation, which better reflects the theme.

| First year | Second year | Third year | Fourth year |

• Main Showing Page

We add more elements of graduation on the main showing page.
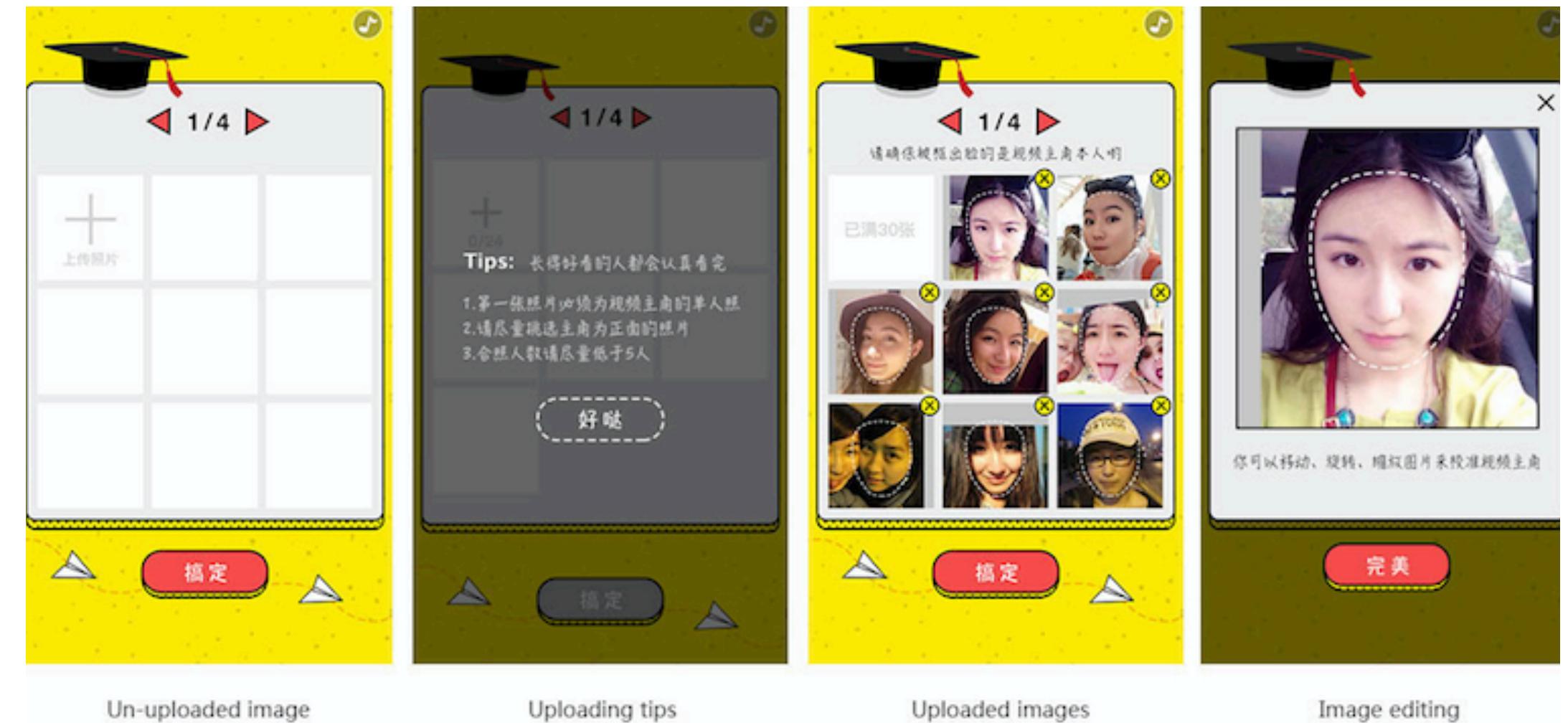
version 1

version 2

version 3

• More UI details about different pages

Based on the sketch, prototype and high quality design, software engineers implemented the software.
More UI details about different pages for un-uploaded image, uploading tips, uploaded images, and image editing are as follows.
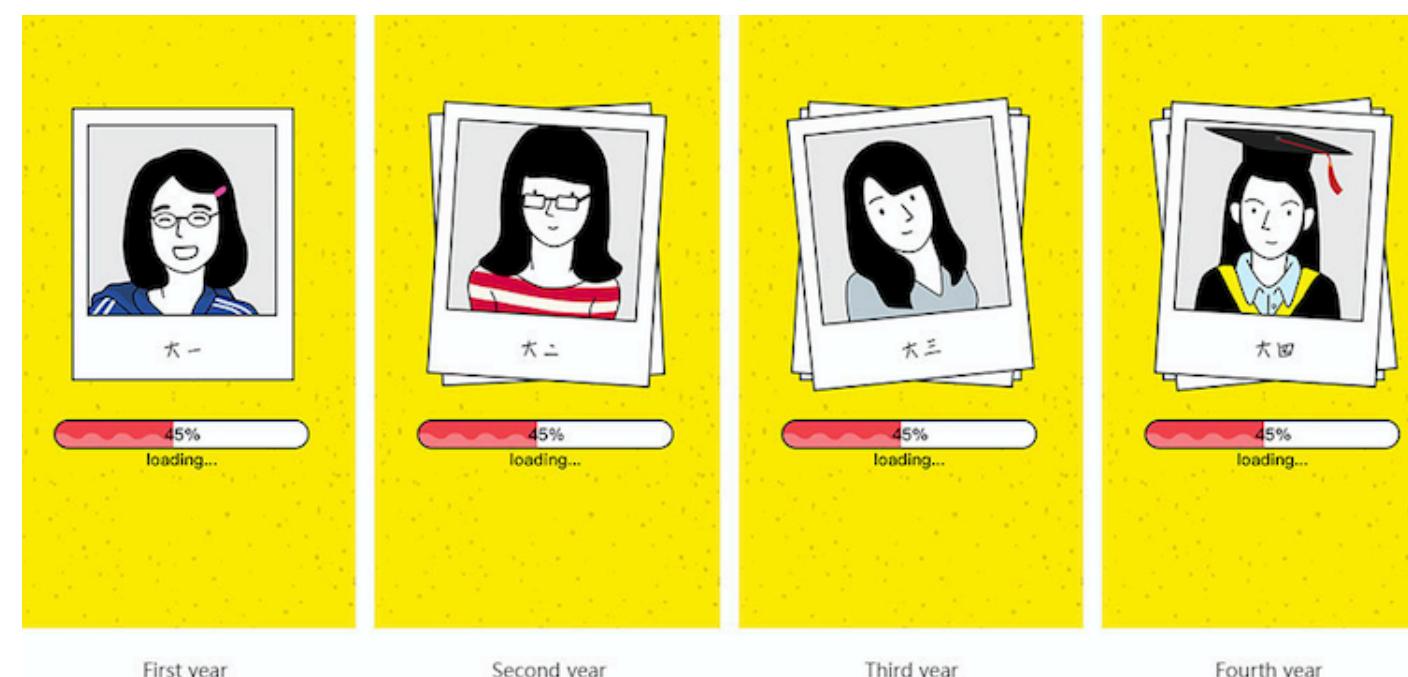
| Un-uploaded image | Uploading tips | Uploaded images | Image editing |

| Choose the theme and music | Generate animation video | Preview result | Save and retweet video |

FoveaCam & DeepData

Human-eye inspired camera boosting the effective resolution
by 100 times & video/image big data analysis system

🏆 ***ITS Golden Lion Awards***
Best New Products Awards named by Intertraffic Asia in 2016

ROLES:
Product Manager & Product Designer & UX Designer

TIME:
May.2016-Mar.2017

SCOPES:
Prototyping,
UX Design,
Scrum Management,
Usability Testing

TECHNOLOGIES:
Computer Vision
(Face Detection,
Human Body Detection,
Vehicle Detection,
Face Identification),
Deep Learning
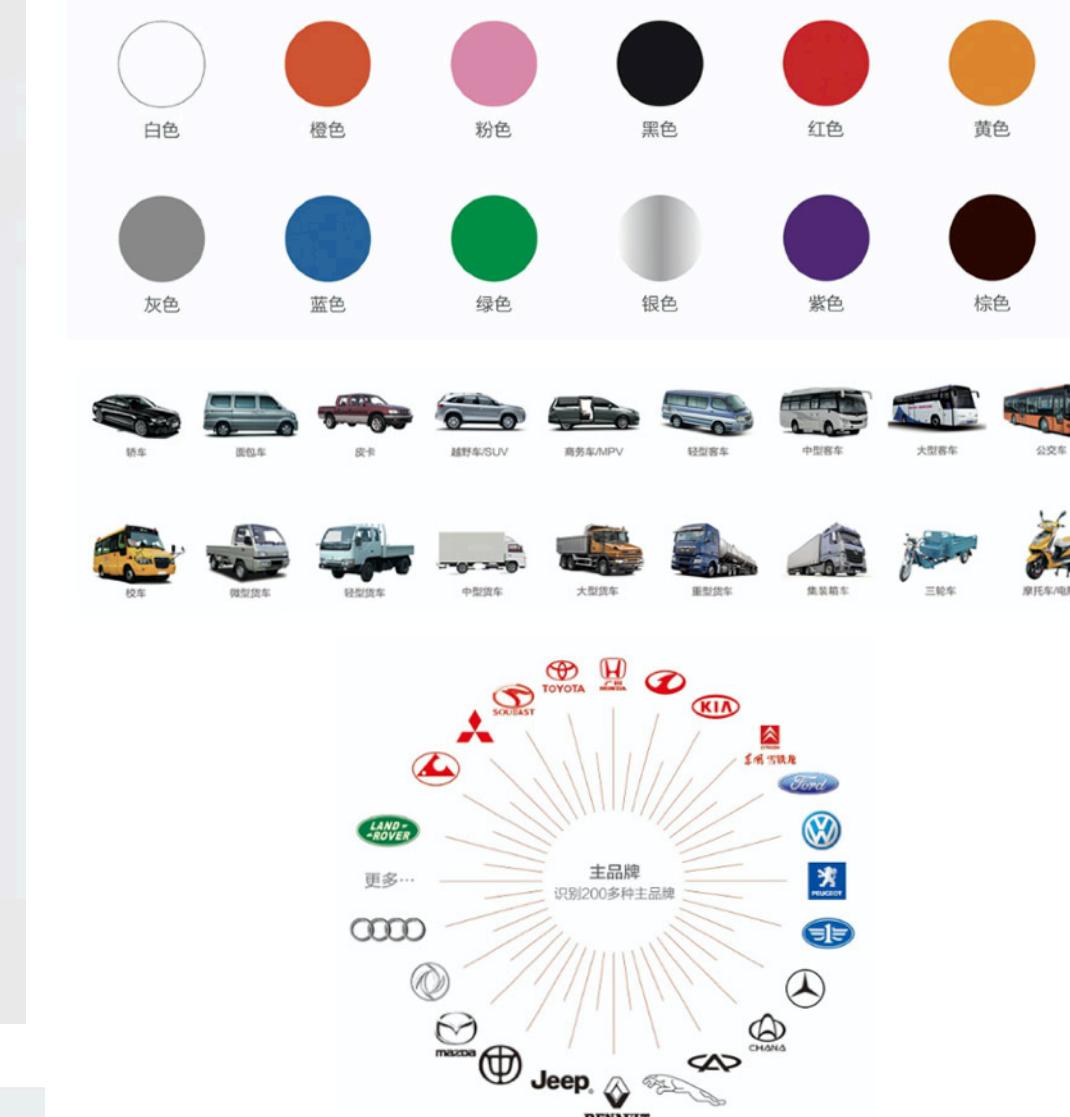
1 Introduction

We are all familiar with those scenarios, in which the policeman find the critical video about the suspect, but unfortunately the face image is too obscure to recognize.

FOVEACAM is born to resolve these kind of problems.

FOVEACAM is the first human-eye-like camera functionally inspired by fovea in the world. FOVEACAM's patented Dynamic Instant Pixel Allocation (DIPA) Technology can dynamically increase the pixel density in a local image region and instantly boost the effective resolution in a specified image region by over 100 times. FOVEACAM can almost ensure capturing all targets appeared in the high resolution scene.

DeepData, as a video/image big data analysis system, uses enormous amount of video/images resources, and applies advanced deep learning, high-performance computing and big data technologies to build the platform that integrates video/image structuralization, storage, data application, and analysis. Its outstanding performance and accuracy greatly increase the utilization of video and image data.


- **Applications**
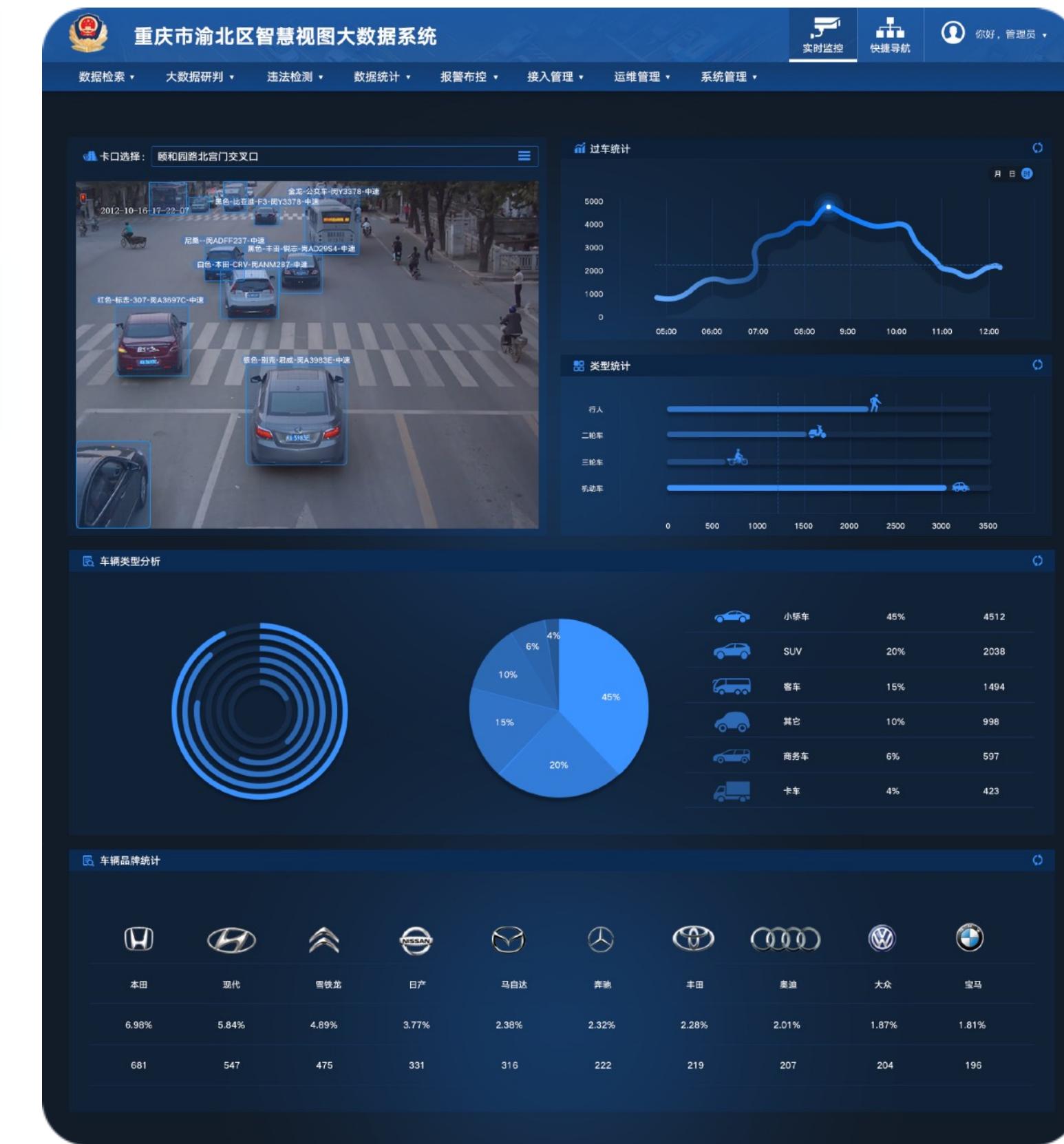
  Intelligent transportation

  Public safety
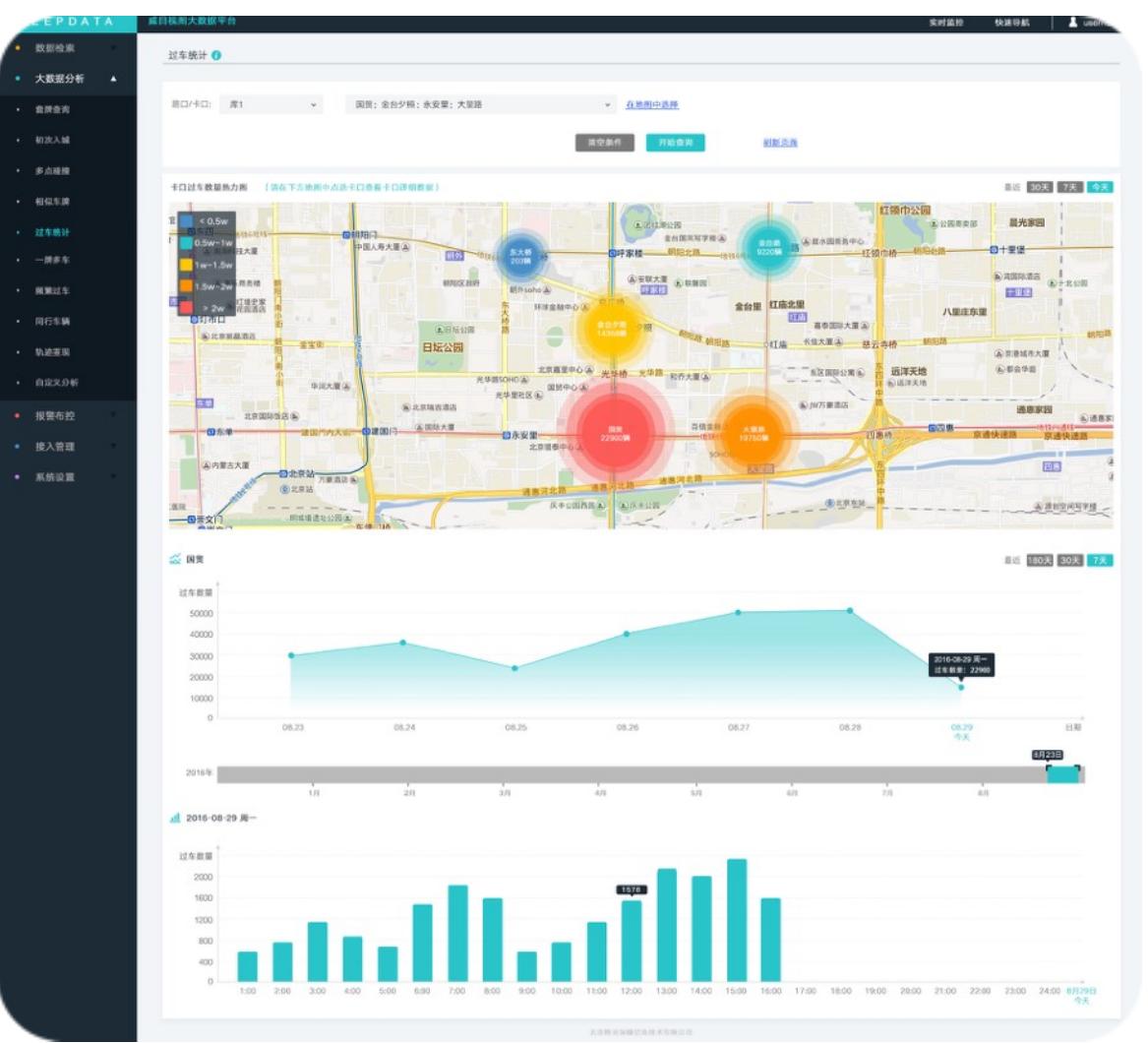
  Business Analysis
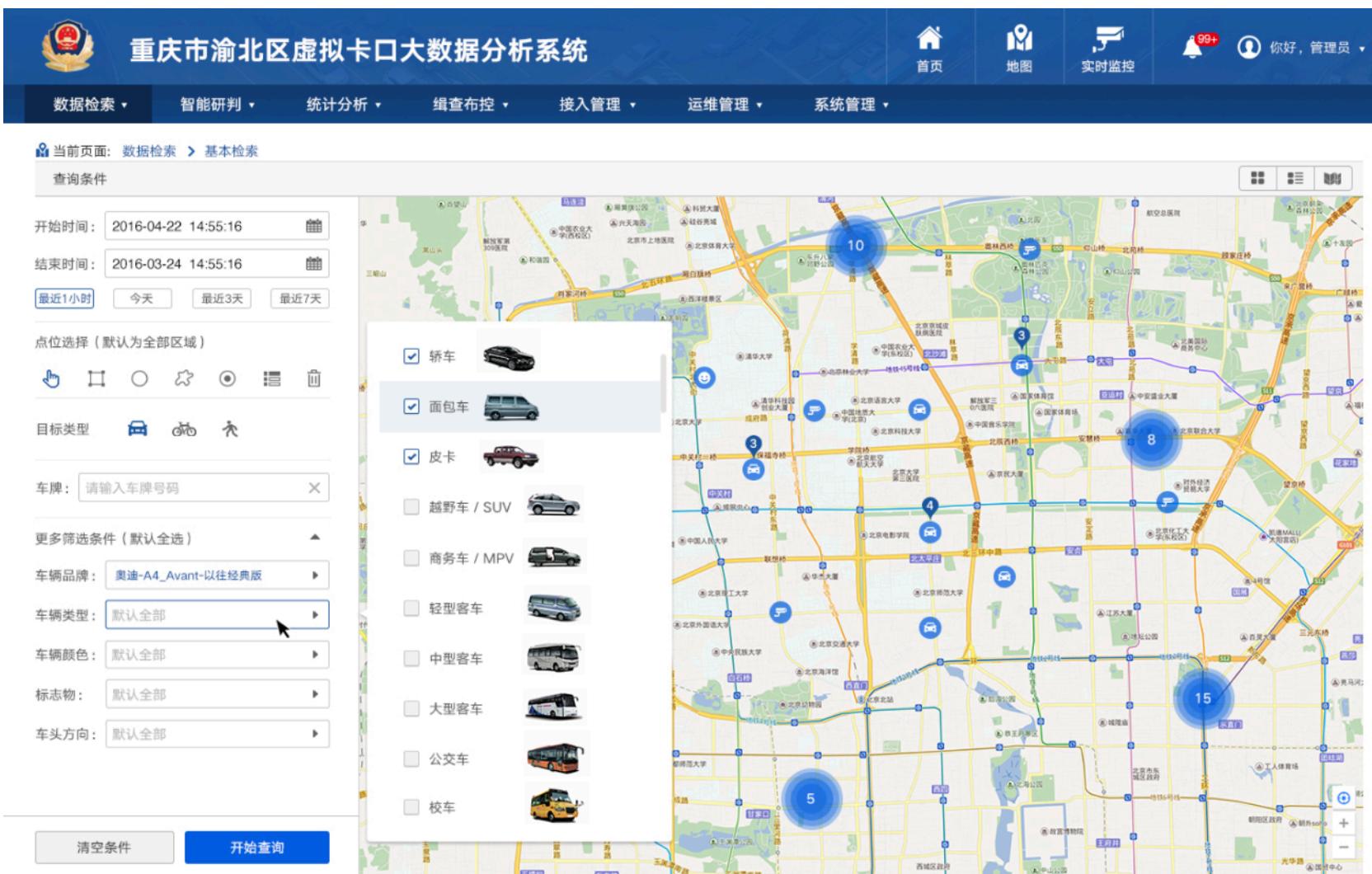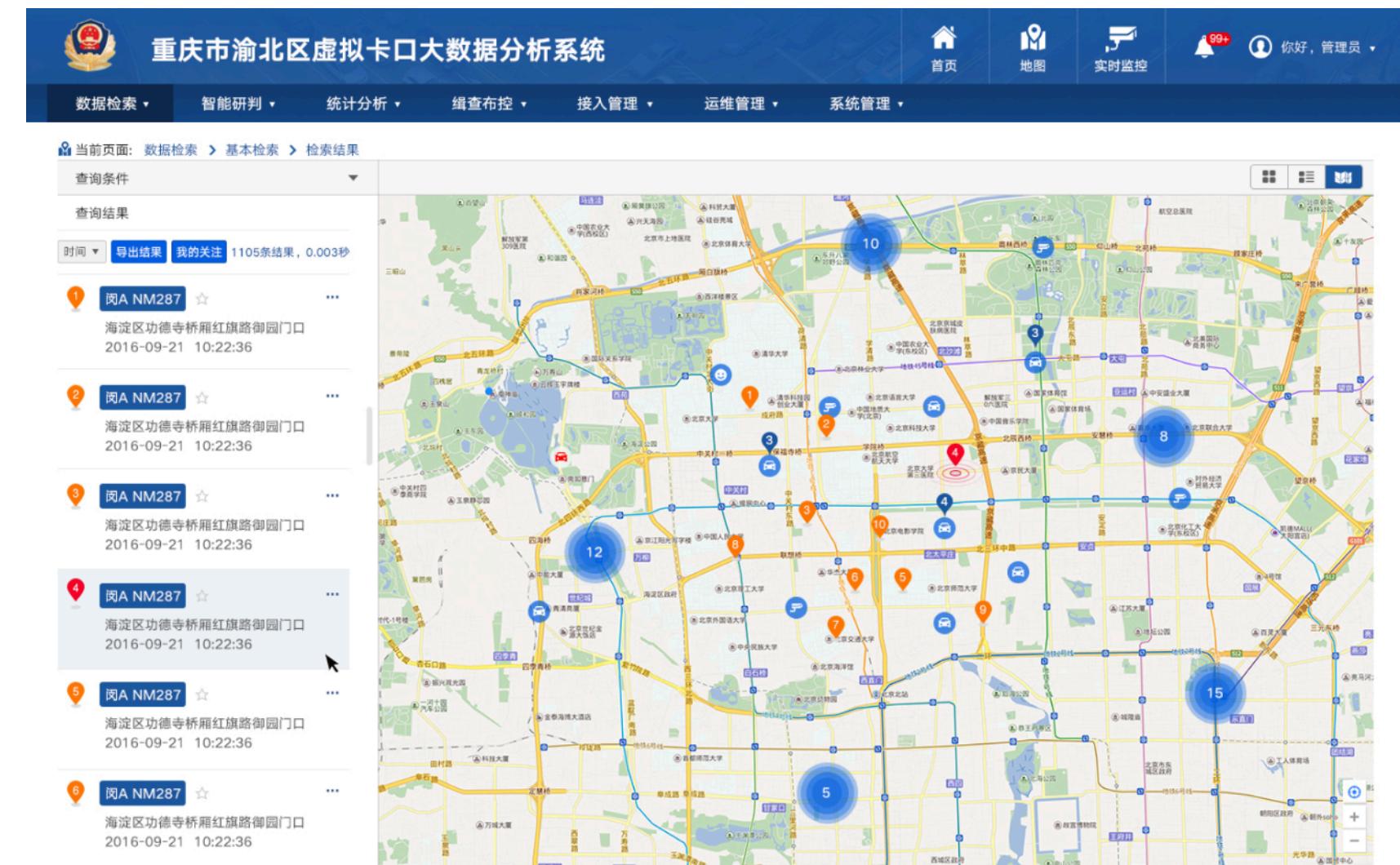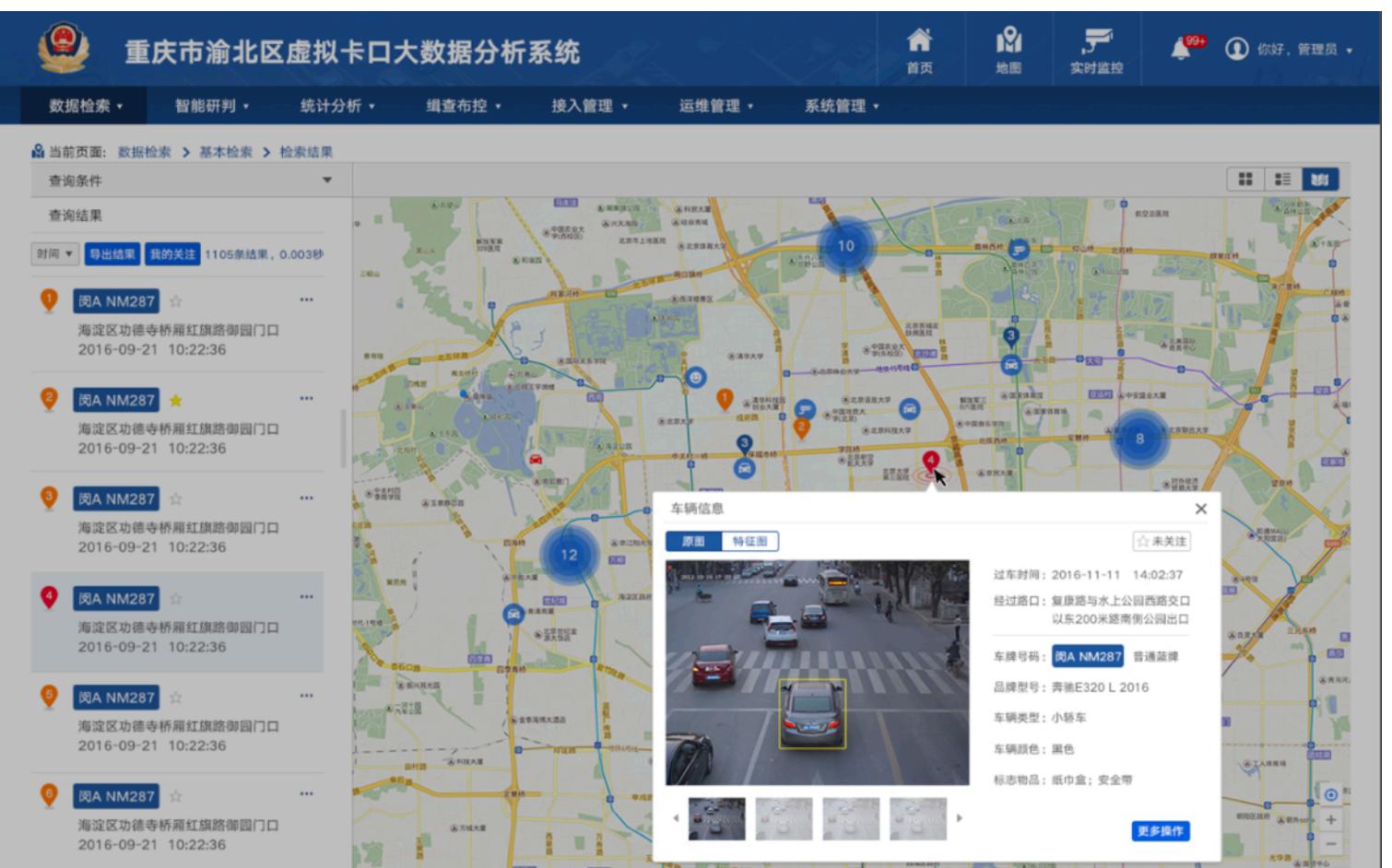
- The page shows the overall situation of the city and the specific statistics to view the situation, as well as the amount of changes in the number of vehicles over time.
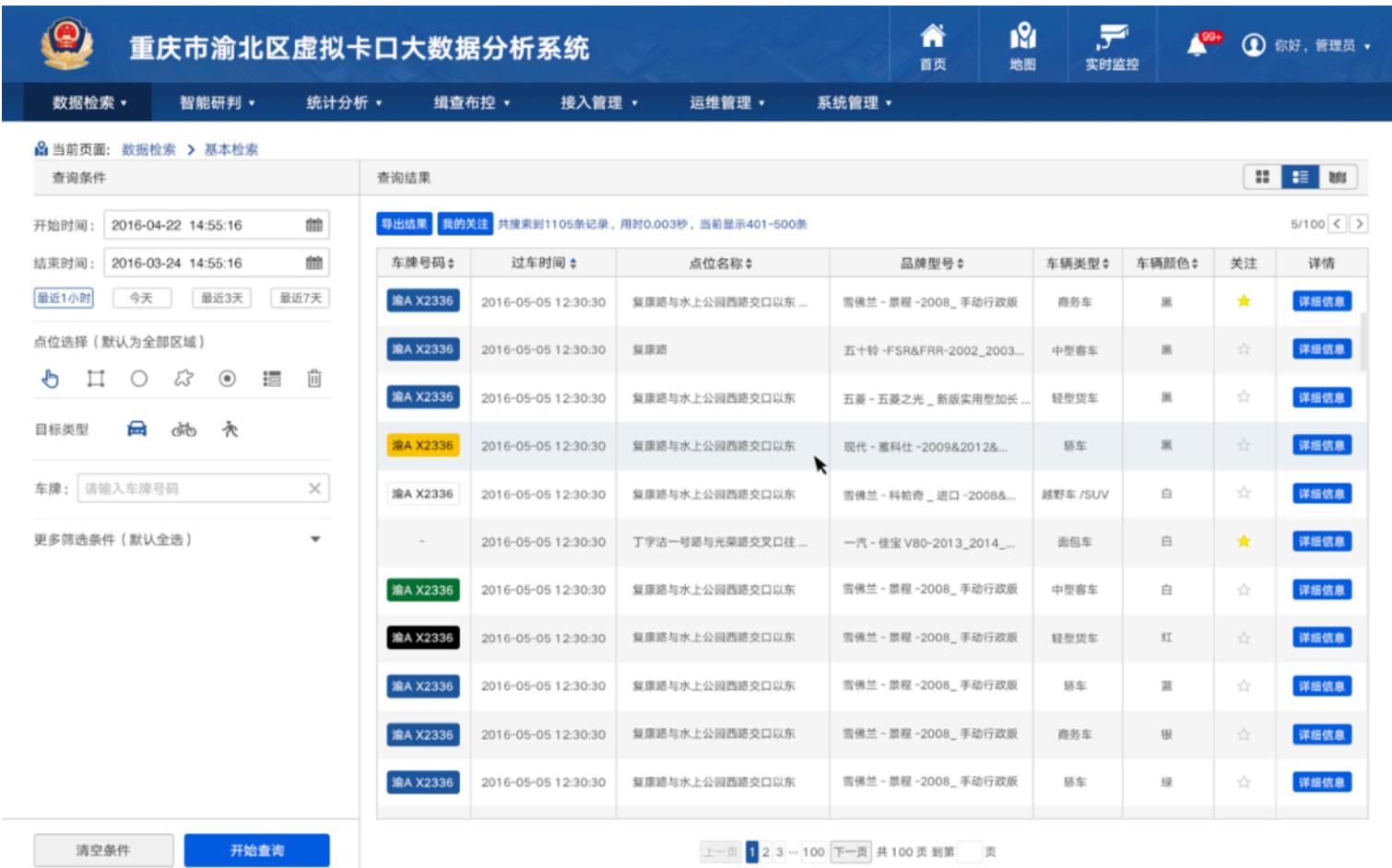
- Users can select the time and location to narrow the scope of searching. Users can select the type of the car they want to find.
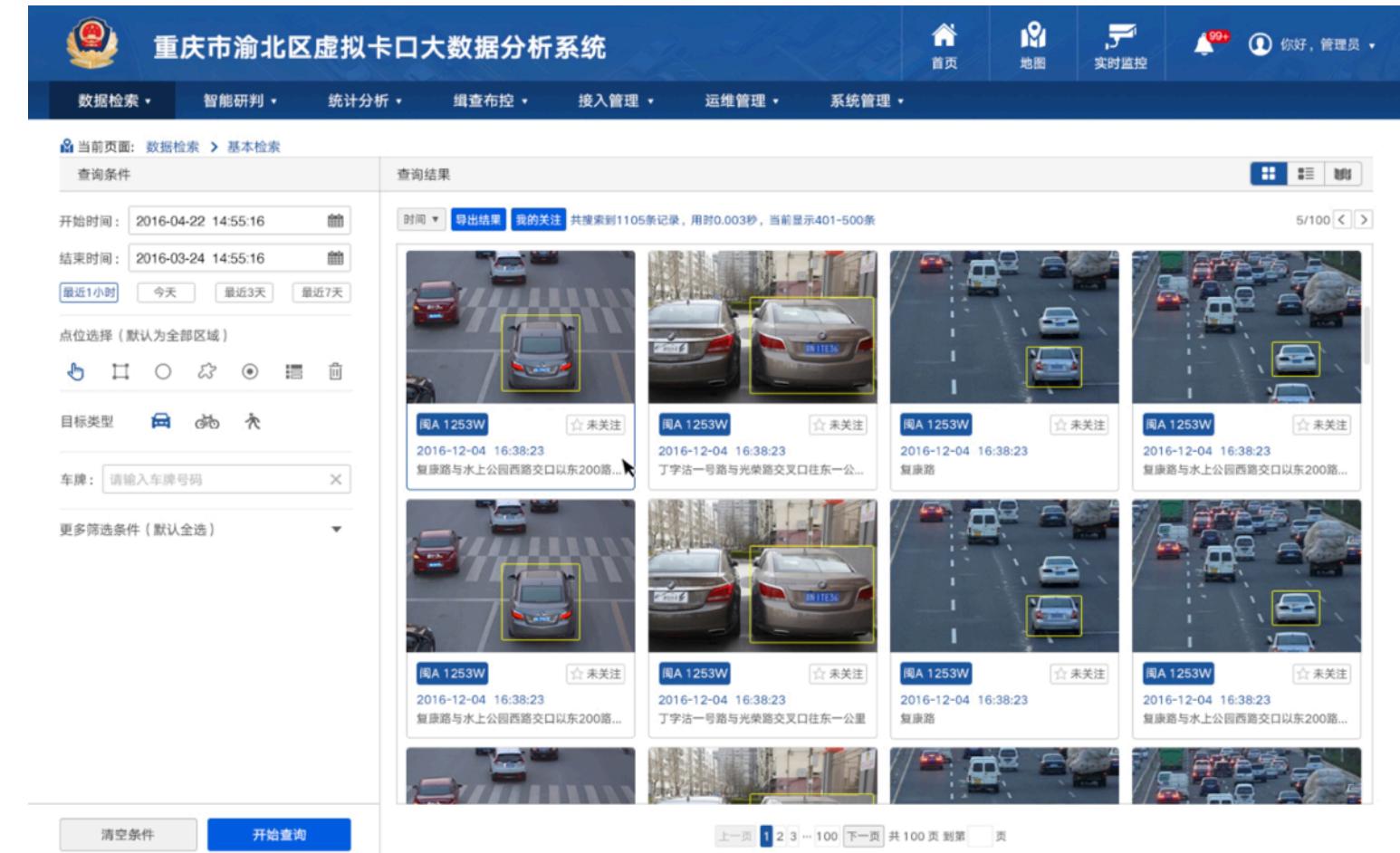
- The results of searching (in the map form)

- The details of the results information after click on a specific pin on the map

- The results of searching (in the chart form)

- The results of searching (in the pic form)

Libra-T

a behavior analysis system with 3D-depth camera

analyzing human behavior and environment with computer vision

🏆 *The 100 Greatest Innovations Of 2016 named by Popular Science Magazine*
The top 10 innovation products of Beijing 2015 named by Beijing government

ROLES:
Product manager & Product Designer & UI/UX Designer

TIME:
Jul.2015-Jul.2016

SCOPES:
Prototyping,
UI/UX Design,
Scrum Management,
Usability Testing
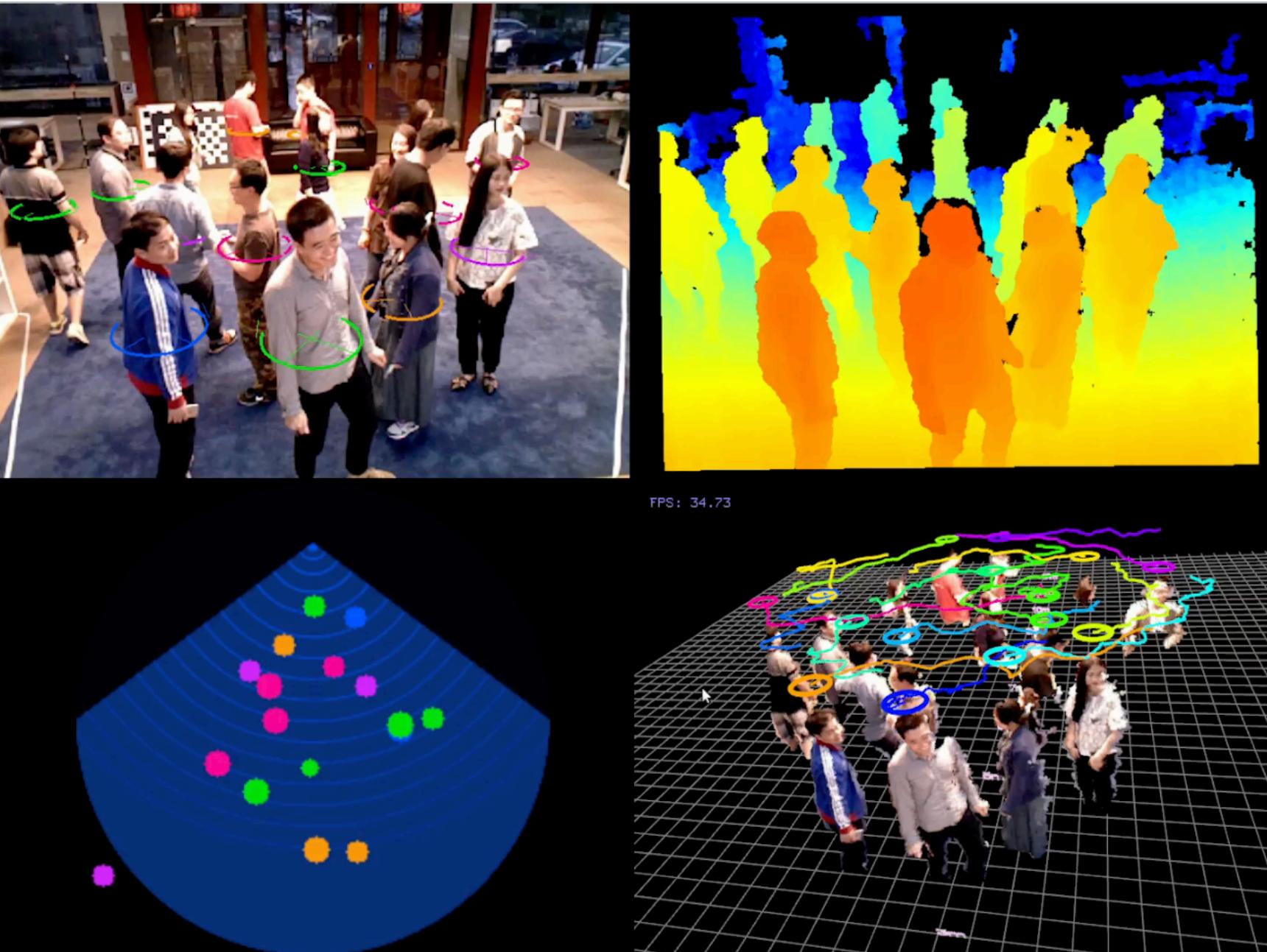
TECHNOLOGIES:
Computer Vision
(People Detection/Tracking,
Posture Analysis,
Depth Marking),
Deep Learning

1 Introduction

Compared with traditional 2D image processing technology, the accuracy of detection and analysis of 3D computer vision technology is higher. As it leverages additional depth information, 3D computer vision technology is able to overcome challenges such as shadows, blocking and confusion of scales.

- **Demo video** youtube: https://www.youtube.com/watch?v=GYvEFGvEi4w

2 Functions Define

- **Detection and tracking**

    Accurately detects multiple targets (more than 40 people) in complex scenes.

| Moving too fast | Path too long | lingering for too long | People counting |

- **Posture analysis**

    Analyses human postures and outputs events.

| Falling | Substantial movement | Calling for help |

- **Zone division**

    Divides up 3D zones, unaffected by blocking and no need for visual marks.

| Crossing a line | Invading a zone | Abnormal number of people | Guarding a zone |

- **Depth marking**

    Virtually lock the original state and detect change of set targets that can guard important targets.

| Box door opening | Item movement |

3 Use Cases Define

- **Banking industry**

    ATM protection, complain check, people counting

- **Retail industry**

   Traffic statistics, display management

- **Museums**

    Exhibits protection and traffic control
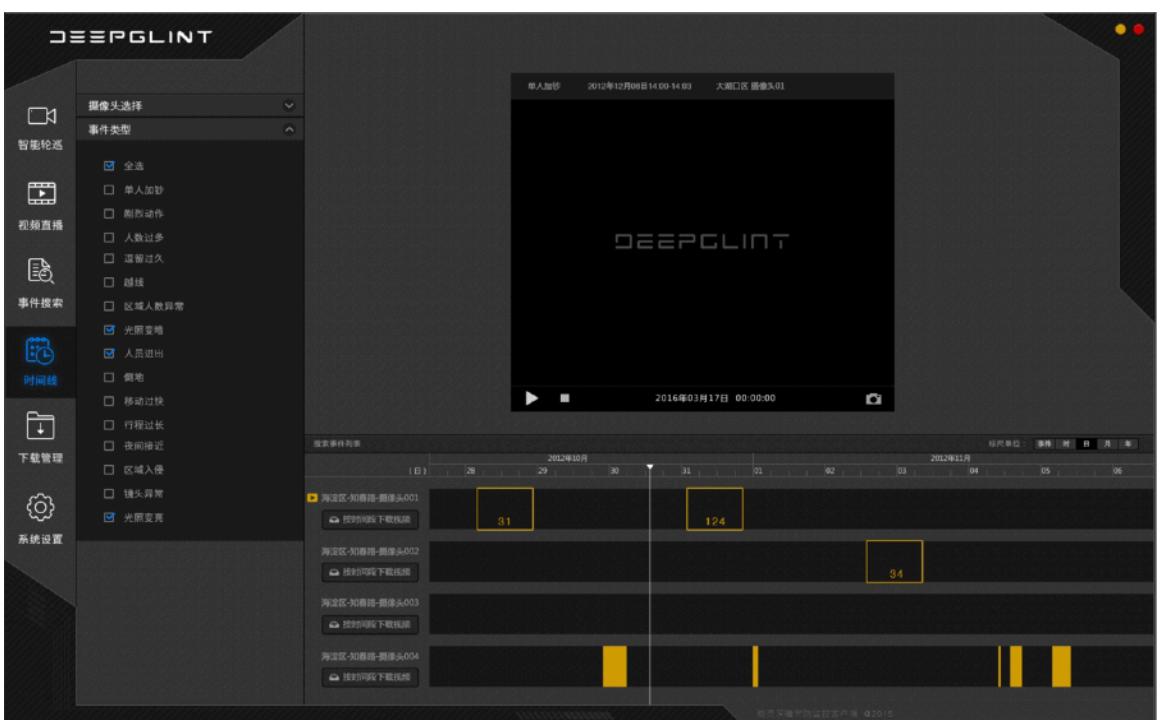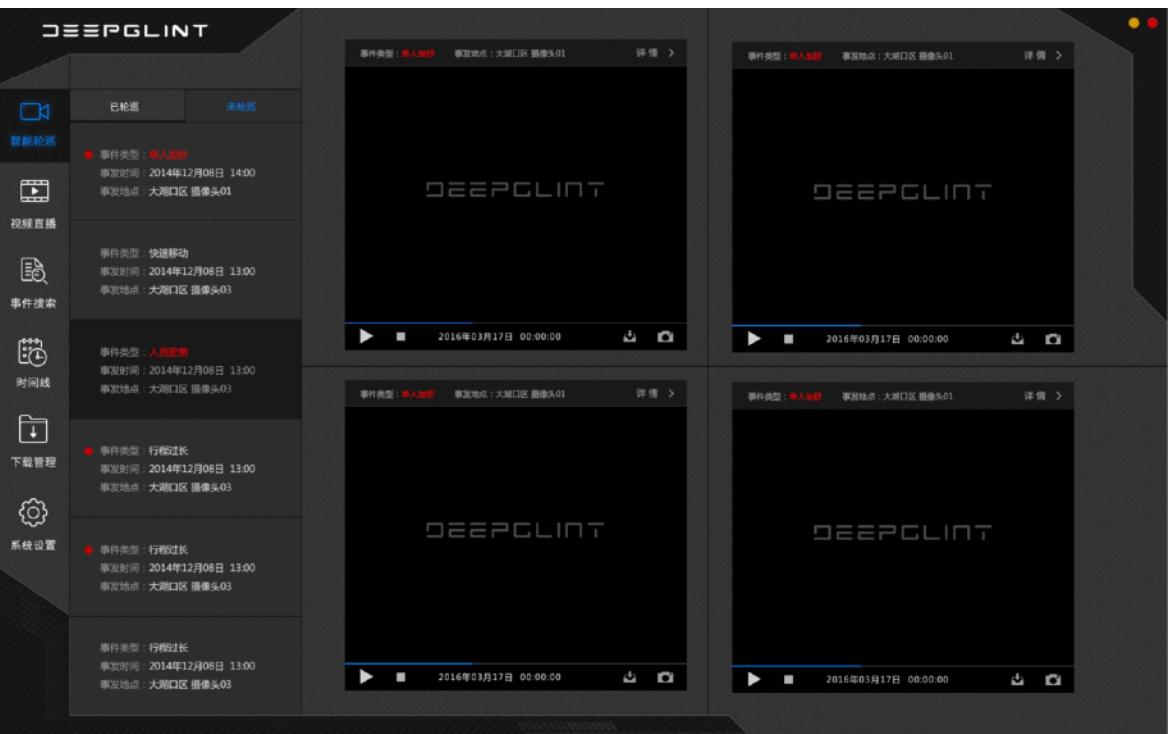
4 High-Quality Prototype

With the help of the 3D-depth camera, we invent **"alert event"** such as People Falling by only offering suspicious video to helped the Security work efficiently, and design the software platform which visualizes the detection and tracking process.
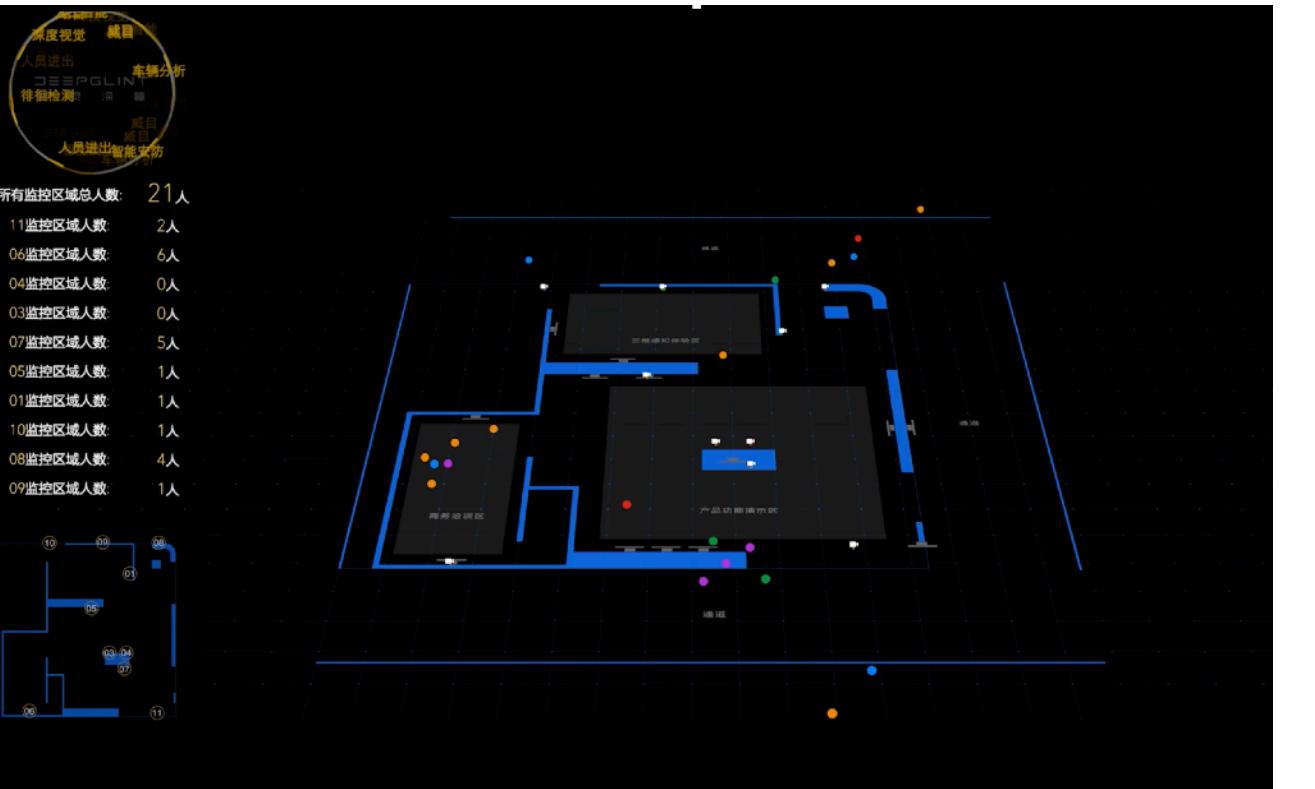

5 Living Map Demo

We can also track everyone in a specific space to see how they move and how much people in this space.

- **Demo video**
 youtube: https://www.youtube.com/watch?v=clMP6mq49wo
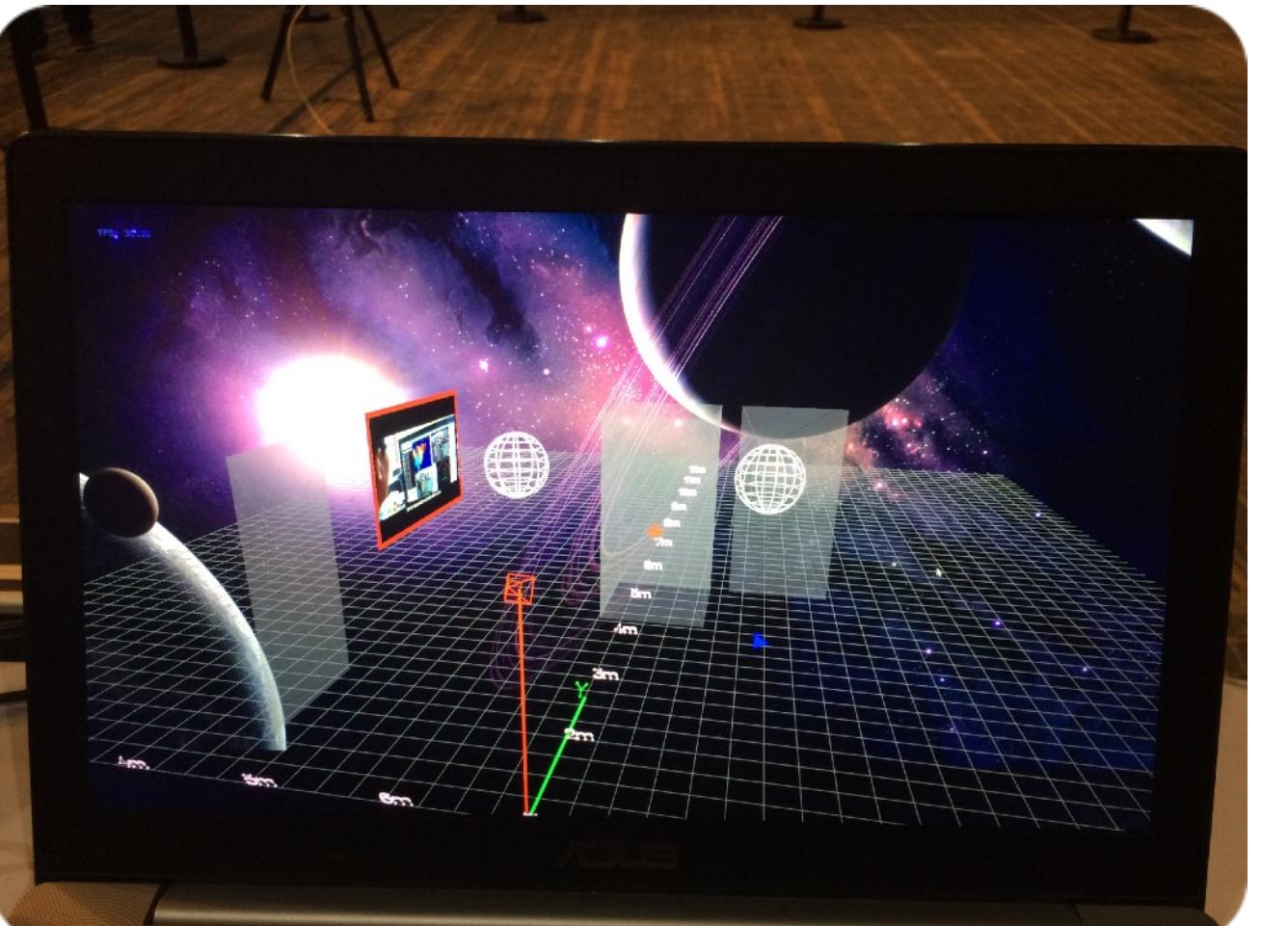
6 3D Space Interaction Demo

With the 3D depth camera's help, people can be tracked and detected and interact with the space, like spin a wall.

- **Demo video**
  youtube: https://www.youtube.com/watch?v=uuqwgSpD4MY
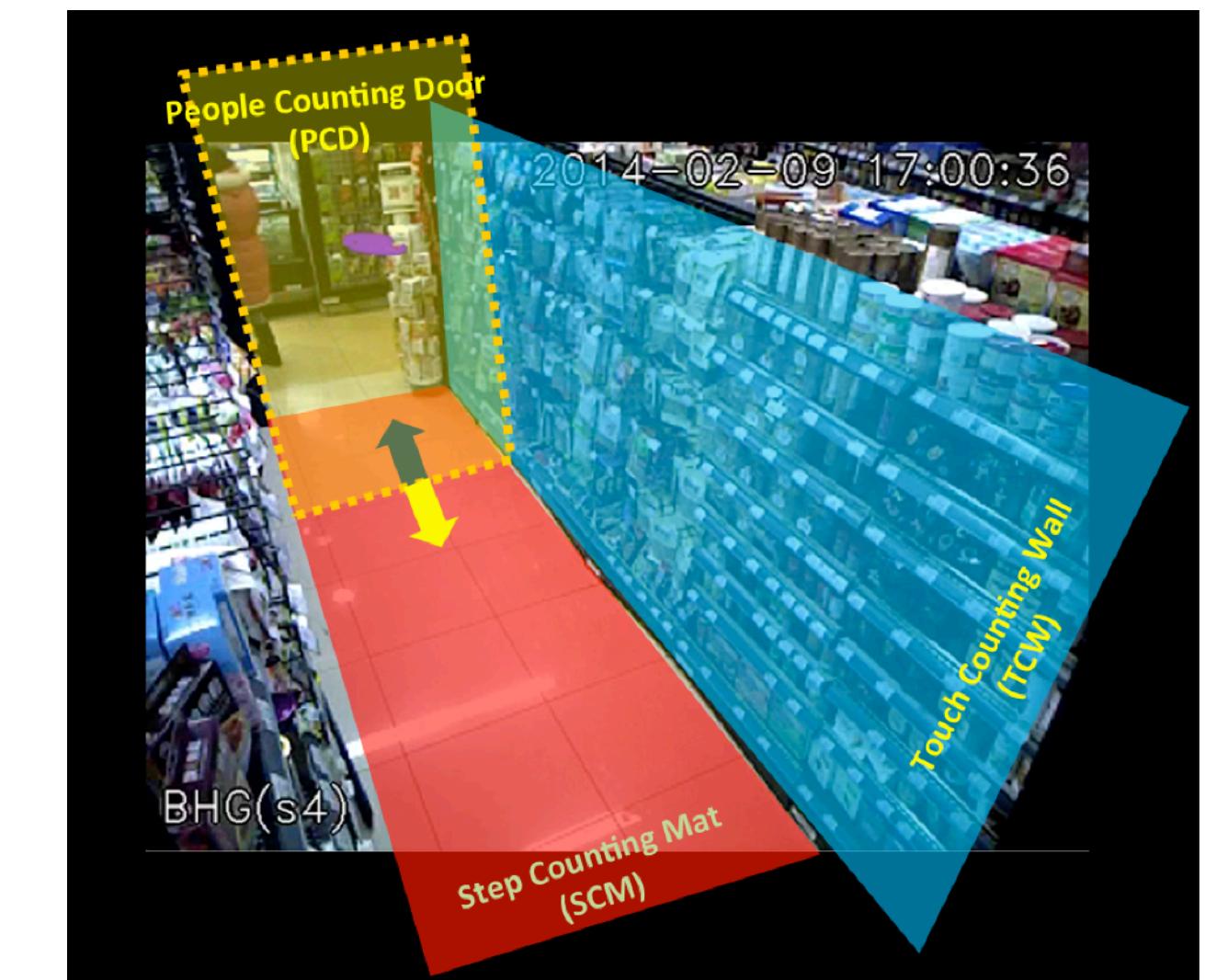

7 Touch Counting Wall Demo

We also apply the system into retail industry and entertainment projects and designed the 3D space interaction.

- Count all voluntary hand touch
- Create heat map of the whole wall
- Create connection between each touch and SKU, in probability sense
- Produce above statistics in multiple temporal scale (min/ hour/day/week/month/year)

- **Demo video** youtube: https://www.youtube.com/watch?v=NEF5Yh8-gCk&t=70s

PRODUCT DESIGN PORTFOLIO

Thanks!

Let's design for the future

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