Part 1 - The exploration of ideas

In the early days of the project, I determined my interest in gesture interaction, so I wanted to complete some meaningful functional design through gesture interaction. So I imagined multiple design scenarios where gesture interaction can be applied. These are some of the ideas that I gave up, but they led me to further find the direction I want to make in the project. It is undeniable that one of the reasons for giving up these ideas is that in some technical implementations, I cannot be sure that I can complete the development of the effect or system.

Research on Gesture Interaction
1. Accurate, Robust, and Flexible Real-time Hand Tracking
https://www.youtube.com/watch?v=RQ-kAoaNc60

idea 1.

Human-computer interaction --- online answering system/online questionnaire system
Project Goal
Use gesture motion control interface image switching

idea2.

Human-computer interaction --- Prototype control of remote video conference scene-gesture expression package

Project Goal
Combining simple visualization effects to optimize barrier-free communication in remote video conferences,
Help people select emoticons through gestures in time when the other party is speaking, and prevent missing the other party's speech when searching for emoticons.
Using machine learning, people use gestures to replace a short word.

Method Action List
Hand detection
Recognize different gestures
Recognize left and right hands
Create visual interactive effects

Pre-requisites for the system

TensorFlow.js
Handtrack.js
Handpose
Openframework
Samples of selected emoticons
Computer with a webcam
Function of planned development
Recognize left and right hands, the same gestures of left and right hands show different expressions including meaning
Add emoticons corresponding to gestures in the video software to explain
Two-hand control can rotate and pinch the emoji package

Challenge
Real-time gesture recognition training
Recognize gestures to trigger the interactive behavior of emoticons
Emoji tracks the location of gestures

Reference
Bambach, S., Lee, S., Crandall, DJ, and Yu, C. 2015. “Lending A Hand: Detecting Hands and Recognizing Activities in Complex Egocentric Interactions,” in ICCV, pp. 1949–1957 (available at https://www.cvfoundation.org/openaccess/content_iccv_2015/html/Bambach_Lending_A_Hand_ICCV_2015_paper.html)
Reference example: https://www.youtube.com/watch?v=O58oc79AdbU
Introduction to hand detection in the browser with Handtrack.js and TensorFlow: https://heartbeat.fritz.ai/introduction-to-hand-detection-in-the-browser-with-handtrack-js-and-tensorflow-e4256fa8184b (Article + example)
Reference tutorial: https://www.youtube.com/watch?v=s66w28knp80
Reference tutorial: Use Tensorflow.js+React.js+Fingerpose for real-time AI gesture recognition https://www.youtube.com/watch?v=9MTiQMxTXPE
Bhuvaneshwari, R., Kavin Pragadeesh, K., & Kailash, J. P. (2020). VIDEO VISION BASED BROWSER ACTION CONTROL USING HAND GESTURES. Journal of Critical Reviews, 7(4), 1549-1559.

idea3.

Human-computer interaction --- Future automotive multi-task interface control
1. Instrument screen: advanced driving assistance information, core vehicle driving information
2. Central control screen: service center for maps, music and Internet content, voice

interaction center for the whole vehicle
3. Co-pilot entertainment screen: Co-pilot entertainment center for music, video, Internet content, independent Bluetooth audio source, multi-screen interaction between points of interest and destination