Design of the system

1. Design of the system

1.1 Blue print of the smart car system

Smart Eye Glass

(Displaying some message)

distance

ranging sensor

Intel Edison

(Arduino

developer

board)

Bluetooth

module

commands

user's orders

other

sensors

（cameras）

Smart Phone

other information

distance and other information

Bluetooth

module

user's orders

1.2 Hardware of the system

1.2.1 Sensors

We use several sensors which are distributed on the user's car to acquire different information from the environment. For example, we have used a ultrasonic sensor on the head of the car to measure distance between the driver's car and the car in front. Also, in the future, we can use some more accurate sensors to look up the weather, the temperature and other environment information the driver is interested.

Another important part of the sensor system is the camera, which we view it as the 'eye' of the smart car system. A camera can capture real time videos. Those videos can used to do many things, including warning the driver if it is too close to the car in front, measuring the distance between two cars, recognizing the signs on the road to give the driver a hint. What we have accomplished is using the pre-captured video to detect cars.

# 1.2.2 Embedded system: Intel® Edison

# Intel® Edison is a very strong embedded system which can be used as a card computer. We use Intel® Edison as the center of our system because of its high quality performance. What's more, Intel® Edison has interface connecting to the sensors and it has its own Wi-Fi and Bluetooth module, making the transition of sensor information with the smart eye glass much more easier.

# Intel® Edison is used to get data collected from the sensors, as well as from the Internet through the Wi-Fi module. The board is also used to do some basic data processing which can smoothen the process of transition.

# 1.2.3 Sony Smart Eye Glass with a Android phone

# The augment reality glass: Sony Smart Eye Glass is employed as an instant displayer in our system. We develop a Android application on the Android phone, which gives several interfaces receiving information from both the Intel® Edison and the phone itself. Then, the glass is connected with the smart phone using Bluetooth. When driving, the information captured and processed by the smart phone can be showed on the screen of the glass, which creates a augment reality experience for the driver. We specially design the HUD system so that the driver can see the information and the road at the same time.

# 1.3 Software of the system

# 1.3.1 Detection system

# We design a detection program embedded into the system. This program can be employed to detect cars, pedestrians and signs on the road. Using this technique, the system can 'understand' what is happening on the road, and then hint the driver.

# The detection system we are now using employs a machine learning algorithm. However, this algorithm runs very slow on the embedded system. So we can do some further research on this issue.

# 1.3.2 Smart eye glass system

# Our smart eye glass system accomplishes two main functions. Firstly, a smart phone(smart glass) application basing on Android is built to deal with BLE(Bluetooth low energy) data. This application is designed to show both the data itself and the data size. It also provides a real time communication between the smart phone and the smart eye glass.

# Also, the HUD information from smart phone via Bluetooth can be displayed on the glass in a character form. These HUD information includes the fuel, speed, date, time and distance traveled.

# 1.3.3 Connection of subsystems

# We use Bluetooth to connect each parts in our system. Bluetooth is a very efficient way of devices' communication in short distance. Furthermore, both the smart eye glass and the board can be linked to an IoT(Internet of Things) cloud service, which allows a communication on a larger scale. At last, all the devices can be connected to the car system, where some information such as fuel and speed can be acquired.