**Project Proposal for Autoplug 3.0**

Group 11

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1. **Project abstract:**

Design a program based on HCS12 microcontroller to help cars change lane and prevent collision. We have ACC to control the speed and acceleration of the cars. If two cars stay too close, the HCS12 will detect this from antenna. Then ACC will receive order from the HCS12 and decrease the speed of the car to prevent collision. For one car to change lane, this car will send a signal to the two cars on the next lane. Then the HCS12 for the front car on the next lane will order the car to move forward, while the HCS12 for the back car on the next lane will order the car to decrease speed to provide enough space for the change-lane car.

1. **A description of project plan, subtask leads and the schedule for the project.**
2. Creating a car in TORCS and it should be able to run all by itself, with constant speed and route. We don’t need to control this car.

Wenxiang Chen is responsible for this part.

(By Nov. 4)

1. Adding one car in TORCS. Connecting HCS12 with TORCS and design ACC based on HCS12. The ACC should be able to control the speed of the car so that the car can catch up with the front car without any collision. We will connect a steering wheel to TORCS so that we can control the direction of our car manually. In part 1, we already have an automatic car. The goal here is that with ACC our car can catch up with the automatic car easily.

Lei Zhang is responsible for this part.

(Nov. 4 – Nov. 10)

1. Adding another car in TORCS which is also controlled by ACC and the steering wheel (Now we will have two sets of ACC and steering wheels). These two cars will communicate with each other about their position and speed by antenna. We will test whether ACC can prevent these two cars from collision.

Chenhui Zhai is responsible for this part.

(Nov. 10 – Nov. 18)

1. Adding a third car in TORCS (Now we will have three sets of ACC and steering wheels in total). We will design an additional code in HCS12 to help cars changing lane. The idea is that first one car sends a signal to change lane. Then the car in front of this car on the next lane will keep moving forward, while the car in the back will decelerate to provide space for the car to change lane.

All of three are responsible for this part.

(Nov. 18 – Nov. 26)

1. Improving the code. Explore how close two cars can go and don’t collide, with ACC on.

All of three are responsible for this part.

(Nov. 28 – Dec. 3)

1. **System architecture.**

TORCS on PC

Car 3

Car 2

Car 1

ACCELERATION

Gate Way

(HCS12)

Steering Wheel

BRAKE

Gate Way

(HCS12)

Gate Way

(HCS12)

BRAKE

ACCELERATION

BRAKE

ACCELERATION

Steering Wheel

Steering Wheel

1. **What we need.**

We need a computer based on linux system, 6 HCS12 microcontrollers and 3 steering wheels.