Preparations 09/05
Poster text

De Borrekens Gauthier

Intro

For this week my job was to think about the text that had to be in the different modules in the poster.

Materials and Methods

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Results

/

Information & conclusion

I will base myself on the poster template I have written out in the previous report

TITLE		team
What **Goal** **Real world** **Future**	**Tests + results** **brake speed test graph**	**Conclusion of project** **Real world porting maybe**
How it works **maybe add illustration of cars to server communication or cars breaking**	**server delay test graph** **...**	**Acknowledgements (prof, UA, ...)**

Title

We should further discuss the title of our project. Some ideas are:

- Intelligent traffic management system
- Decentralizing car intelligence

We will add an illustration in this area (But not spanning the entire size / overlapping the text)

Bottom right of the title bar:

Asif Wasefi: Networking

Ali Amir: Electronics

Satish Singh: Electronics

Daniel Smetankin: Electronics

Gauthier de Borrekens: Software

everyone ok?

What

This project will demonstrate how the future of our traffic might look. It is based on two big concepts

- Making cars more intelligent
  The cars itself will gather all possible data like the position of other cars and possible obstacles on the road.
- Connecting all the cars to a widespread 'Traffic network'
  All the data will be sent and processed in the main 'Traffic Network', which could do all kinds of things, like calculate the most efficient route, let cars automatically avoid obstacles or prevent car accidents.

This project is just a prototype but can be expanded in all directions, including a future where every car will be self-driving and connected with the Traffic Network, receiving controls and directions.

Maybe a picture of traffic like late at night or something

How it works

This project is a prototype showing off some of the possibilities of this idea.

The intelligence is shown by cars adjusting their speed according to the position of the car in front of them.

The Traffic network is shown by sending all that information to a server. This server can also send a break command.

Components

- Car: We use RC-cars which are controlled by a microcontroller. The servo-motors are connected with a H-bridge.
- Microcontroller: We use the NodeMCU microcontroller which contains WiFi.
- Peripherals: HC-SR04 ultrasonic distance sensor.
- Server: Ubuntu WIFI-server which will communicate using UDP packets.
- Software: Arduino IDE

Add an illustration like Satish's poster. Maybe connected in 1 big schematic showing batterypack -> H-bridge -> nodeMCU + servo -> … without going into too much details like pin nr and voltages. A easy-to-understand and visually attractive picture.

How it works

The cars will detect the distance of the car in front of them using ultrasonic waves and change their speed accordingly. That information is sent to a ubuntu server which stores all the data.

The server can also turn off the cars in case of an emergency or an accident.

Add Illustration of cars sensing other cars & communicating with a server (drawing, …)

Test

This project relies on two big factors, the distance measurement and the server communication.

Test1

Cars adjusting their speed:

We tested the speed of one car while controlling the car in front of it. The car will automatically adjust its speed according to the distance shown. Both the car speed and the distance of the car in front of it will be plotted on a time-graph.

Add graph of the speed of the cars vs the distance they measure

Add photo of the set up and the code.

Discuss the results

<u>Test2</u>

Sending and receiving packages to ubuntu: We will send 1000 packages from the Ubuntu to a NodeMCU with a delay of 10ms in between. The NodeMCU will reply to all the packages it receives and a graph will display the speed at which the reply-packets come in relative to the sent packages. It will be plotted on the time-axis. Any faulty results will be displayed by a red X. We will also test the speed at which the car will break when a 'stop'-command is sent.

Check reliability of 1K packets

Check latency when a 'break' is sent : Graph

Discuss results

Conclusion

depends on test results

This project shows a way to improve the intelligence of cars and set up a big traffic network which provides a safer, smarter and more reliable way of managing traffic.

<u>Porting to the real world</u>

As we cannot use WiFi, It is recommended to go through satellite to connect to the server.

Ultrasonic distance measurement would be replaced by 'LIDAR', a laser-based detection system.

The UDP-packets, which gives us very high speed, will not be reliable enough in a real-world application. More reliable protocols like TCP will be used.

Very important would be a very high security for the Traffic Network, as this will probably be a key target for terrorist attacks or other dangerous situations.

Maybe add an illustration of [x] -> [y] for the porting, like [Sonar] -> [Laser] but with pictures.

Acknowledgements

We would like to offer our great appreciation of Professor S.Sleutel and W. Loockx for assisting us in the creation of this project. We are also very grateful for the University of Antwerp to let us use all the materials needed to create and test everything.