

Hobby Project Proposal

Background

Development of autonomous vehicles is a hot topic in the automotive field. Several automotive companies are investing in this field. Ford has 10 years plan for developing autonomous vehicles. GM is investing heavily in autonomous vehicle R&D. Several other companies such as Honda, Hyundai, Jaguar, Mercedes, NISSAN, Renault, TESLA, FCA and many more are investing on the autonomous vehicles research.

The works on platooning which is done in Scania, Volvo trucks, DAF, IVECO and MAN, is very close to the topic of autonomous vehicles, and different projects are defined around them every year.

Bosch has dedicated more than 2000 engineers to work on driver assistance technology, and provides services to google, Tesla and Porsche. DELPHI is another active company in this field.

Even companies like Google and Apple are developing such vehicles. Apple team is said to be around 1000 people working on its autonomous vehicle project. BMW and the Chinese search engine Baidu are working on electric autonomous vehicles.

Considering the fact that the topic of “Autonomous vehicles” is quite young, and most of the R&D in the companies on this field is new, it is obvious that investing on developing competence in this field is beneficial for AVL Sweden in the long term.

Since the focus of R&D in AVL Sweden is directed towards alternative fuels, and it is difficult to define a project related to both Autonomous vehicles and alternative fuels, another alternative is to start a hobby project, and acquire the knowledge from that. The long term objective is to develop competence in some of the specific fields in the autonomous vehicle area, and hopefully define/find real projects in the future.

Scope of the project

Considering the difficulties and complications in making a real vehicle autonomous, it is natural to work on smaller scales. The suggestion is to use an RC car as platform. The scope of the project would be to make the car autonomous, i.e. it should be able to travel between defined specific points by itself, considering random traffic. There are many different areas to work on in the field of autonomous vehicles. Since the project is performed in the control group, the suggestion is to emphasize on localization, mapping, path planning and obstacle avoidance algorithms. The intention is not to develop new technologies, but rather application of already available ones. Note that some of the people in the control group are already familiar with the field, and it is possible to use their expertise in this area.

Project plan

The initial phasing of the project is as follow.

Phase 1: state of the art and state of the practice studies.

In this phase, different technologies should be studied, and proper technologies to apply need to be investigated.

Phase 2: modelling and simulation

In this phase, a model of the vehicle/environment will be constructed in Simulink and the algorithms will be developed. The algorithms will be tested in simulation environment.

Phase 3: implementation

In this phase, the algorithms will be implemented on the RC car and the vehicle will be tested in different scenarios.

Phase 4: sum up and preparation for next phases

In the ideal case, the results from the whole project can be review, and a new hobby project with wider scope can be defined.

Resource and budget requirements:

The initial estimation for budget is <10000 SEK. It is estimated that 4 people are needed to be involved in this project for developing such vehicle in 1 year. However, it is possible to work with less people in a longer time frame.