

Development of a Self-Driving Car Platform for Research and Education the ISEAUTO Project

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Abstract

Self-driving cars are becoming more prevalent in our society, and it is important to educate and train the next generation of engineers and researchers in this field. The ISEAUTO project is a self-driving car designed for research and education purposes, aimed at providing students with practical experience and competence development. This research paper discusses the technical solutions and safety features of ISEAUTO, as well as the learning experience it offers to students. The project scope includes the design, construction, and testing of the car, as well as the development of control architecture and technical parameters. The paper concludes with suggestions for future work and references to similar projects in the field.

Keywords: *Self-driving car, ISEAUTO, research, education, practical experience, competence development, technical solutions, safety, learning experience.*

INTRODUCTION

Self-driving cars, also known as autonomous cars, are vehicles that are capable of sensing their environment and navigating without human input. They have the potential to revolutionize the transportation industry by improving

safety, reducing traffic congestion, and increasing mobility for individuals who are unable to drive. As the development of self-driving cars continues to progress, there is a growing need for research and education in this field. The ISEAUTO project aims to address this need by

developing a self-driving car platform for research and education purposes.

Similar Projects:

There have been several self-driving car projects developed by both industry and academia. Some notable examples include Google's Waymo, Tesla's Autopilot, and Uber's self-driving car project. These projects have focused on developing self-driving car technology for commercial use. In contrast, the ISEAUTO project focuses on developing a self-driving car platform for research and education purposes.

Project Scope:

The ISEAUTO project aims to develop a self-driving car platform that can be used for research and education purposes. The platform will be designed to be modular and configurable, allowing researchers and

students to experiment with different sensors, algorithms, and control systems. The platform will also include software tools and simulators to enable students to develop and test their own autonomous driving algorithms.

Background and Aims:

The development of self-driving cars requires expertise in several areas, including robotics, artificial intelligence, control systems, and software engineering. The ISEAUTO project aims to provide a platform that enables students and researchers to gain practical experience in these areas. The project also aims to contribute to the development of self-driving car technology by providing a testbed for new algorithms and control systems.

Table 1: Comparison of ISEAUTO and Similar Projects

Project	Purpose	Target Market	Technical Focus
ISEAUTO	Research and Education	Academic	Modularity and Configurability
Waymo	Commercial Use	General Public	Sensor Fusion and Machine Learning
Tesla Autopilot	Commercial Use	General Public	Sensor Fusion and Machine Learning
Uber	Commercial Use	General Public	Sensor Fusion and Machine Learning



Figure 1: ISEAUTO Self-Driving Car Platform

Practical Study for Students:

The ISEAUTO project aims to provide students with practical experience in developing autonomous driving algorithms. The platform will include software tools and simulators that enable students to develop and test their own algorithms. The platform will also be configurable, allowing students to experiment with different sensors and control systems.

Competence Development:

The ISEAUTO project aims to develop the competence of students in several areas, including robotics, artificial intelligence, control systems, and software engineering. By providing a platform for hands-on experimentation and learning, the project

aims to produce graduates who are well-prepared to work in the field of self-driving car technology.

Technical Solution:

The ISEAUTO platform will consist of a self-driving car equipped with various sensors and control systems. The sensors will include cameras, lidar, radar, and GPS. The control systems will include perception, motion planning, and control. The platform will also include software tools and simulators for algorithm development and testing.

Body Construction and Technical Parameters:

The body of the ISEAUTO self-driving car will be designed to be modular and

configurable, allowing for easy customization and experimentation. The car will be equipped with sensors and control systems that are commonly used in the development of self-driving car technology. The technical parameters of the car will be designed to meet the requirements of the specific research and education tasks.

Control Architecture:

The control architecture of the ISEAUTO platform will include perception, motion

planning, and control. The perception module will be responsible for processing data from the various sensors and generating a representation of the environment. The motion planning module will generate a trajectory for the vehicle based on the perceived environment, while the control module will execute the trajectory to drive the vehicle. The control architecture will be designed to be modular and configurable, allowing for experimentation with different algorithms and control systems.

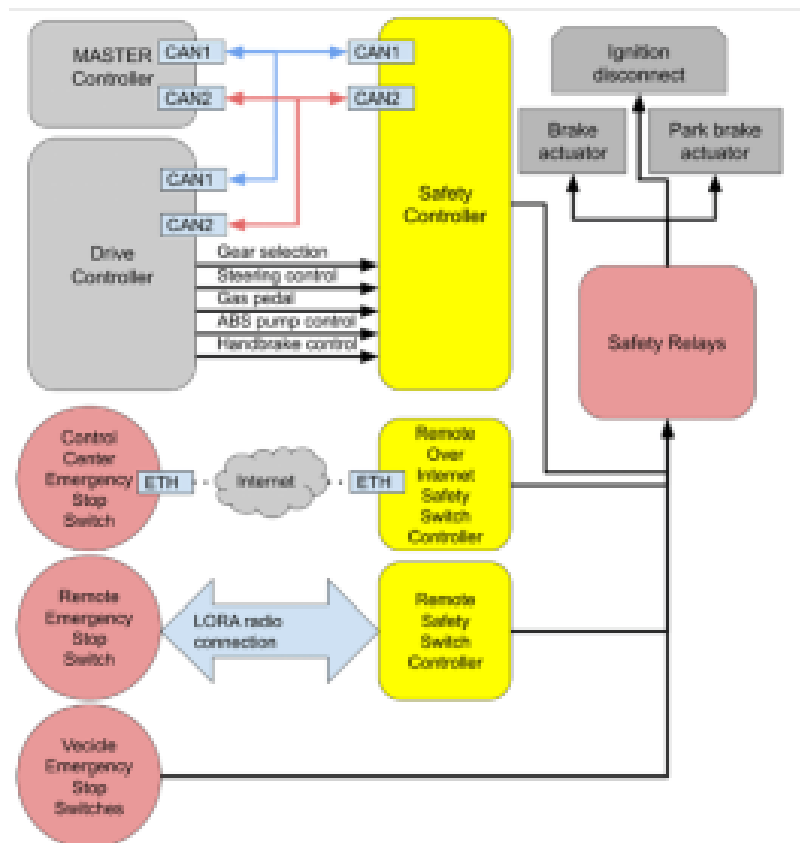


Figure 2: ISEAUTO Control Architecture

Safety:

Safety is a critical concern in the development of self-driving car technology. The ISEAUTO platform will be designed with safety in mind, including redundant sensors and control systems, as well as fail-safe mechanisms to prevent accidents. The platform will also include software tools for testing and verifying the safety of autonomous driving algorithms.

Learning Experience:

The ISEAUTO project aims to provide students with a comprehensive learning experience in the field of self-driving car technology. The platform will provide hands-on experience in developing autonomous driving algorithms, as well as exposure to the latest advances in the field. The project also aims to foster collaboration between students and researchers from different disciplines, creating a multidisciplinary learning environment.

FUTURE WORK

The ISEAUTO project is an ongoing effort, with several areas for future work. These include the development of new sensors and control systems, as well as the integration of the platform with other research and education initiatives. The

project also aims to contribute to the development of self-driving car technology by conducting research and publishing results in relevant academic conferences and journals.

CONCLUSION

The ISEAUTO project aims to develop a self-driving car platform for research and education purposes. The platform will be designed to be modular and configurable, allowing for experimentation with different sensors, algorithms, and control systems. The project aims to provide students with practical experience in developing autonomous driving algorithms, as well as contribute to the development of self-driving car technology through research and publications.

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