Software Engineering - Term Project

Autonomous RC Car

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Autonomous RC Car

Introduction

The project aims to build autonomous RC car using Raspberry Pi as a processing chip. A camera along with an ultrasonic sensor is used to provide necessary data from the real world to the car. The car is capable of reaching the given destination safely and intelligently thus avoiding the risk of human errors.

Clear Statement of the Problem

The safety of the vehicle's passengers and bystanders is of the utmost concern. In order to increase roadway safety autonomous vehicles are under development and are the focus of many research projects. Therefore, the vehicle is required to be more intelligent and autonomous.

Objectives & Scope

The main objective of the project is to design and implement an autonomous car at small scale. The scope of the project is to reduce risks and human errors by creating an intelligent car. This can later be implemented on real cars.

Motivation

According to the World Health Organization, more than 1 million people lose their lives on the road due to car accidents. These numbers show that cars cause serious casualties. The motivation behind this project is to improve car safety and efficiency.

Related Work

In previous work, the project has done using Neural Network algorithm with OpenCV library. The goal of the proposed project is to implement it with Tensor Flow which more efficient than OpenCV in computation.

Project Plan

The project will be divided into small modules. These modules will be tested one by one. After test process, these modules will be integrated into one complete system.

Resources Required

The list of required resources for this project are following:

- Hardware

- Rasberry Pi 3 Model B
- Picamera
- Arduino UNO
- Motor Shield L293D Driver
- Ultrasonic sensor

- Software

- Python
- OpenCV
- PiSeries
- PyGame

References

1. [Gurjashan S. Pannu, Mohammad Dawud and Pritha Gupta], "*Design and Implementation of Autonomous Car using Raspberry Pi*" in International Journal of Computer Applications, Vol. 113.
2. [Rui Zheng, Chunming Liu and Qi Guo], "*A decision-making method for autonomous vehicles based on simulation and reinforcement learning*" in Machine Learning and Cybernetics (ICMLC), IEEE.
3. [Xi Xiong, Jianqiang Wang, Fang Zhang and Keqiang Li], "*Combining Deep Reinforcement Learning and Safety Based Control for Autonomous Driving*" in State Key Laboratory of Automotive Safety and Energy, Tsinghua University.