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Undergraduate Research Abstract Submission

Autonomous Vehicle for Asphalt Laying

Autonomous vehicles are constantly being developed and are gaining recognition from many industries to improve workplace safety and efficiency. This project intends to weaken the barrier that prevents the usage of autonomous vehicles in the workplace. To move toward this objective, this project focuses on developing a computer vision system for an autonomous utility vehicle that lays asphalt. The goal of this project is to directly address the issue of the high number of potholes in our driving roads, which create a dangerous and hazardous environment for persons that utilize motorized and non-motorized vehicles on roads. The vehicle's computer vision system will be executed using a stereo depth camera sensor and will be primarily focused on two factors: detecting and driving toward potholes with high accuracy and avoiding common workplace objects such as persons, equipment, etc. A deep-learning neural network with custom-trained data of more than 4000 images is currently being utilized to detect a test target with up to 85% confidence; we intend to utilize the same deep-learning model to train data for accurately detecting potholes. The vehicle distinguishes nearby objects by utilizing the depth detection features of the camera. This project has the potential of obtaining several implications. Creating better quality roads, improving workplace safety, and increasing production/efficiency are all results that may flourish through successful execution and implementation of this project.

Keywords:

- Autonomous Vehicle
- Computer Vision
- Path Planning and Navigation
- ROS
- Asphalt Laying