

ESP1848

Low-Cost, Real-Time Obstacle Avoidance for Mobile Robots

The goal of this project¹ is to advance the field of automation and robotics by utilizing recently-released, low-cost sensors and microprocessors to develop a mechanism that provides depth-perception and autonomous obstacle avoidance in a plug-and-play fashion. We describe the essential hardware components that can enable such a low-cost solution and an algorithm to avoid static obstacles present in the environment. The mechanism utilizes a novel single-point LIDAR module that affords more robustness and invariance than popular approaches, such as Neural Networks and Stereo. When this hardware is coupled with the proposed efficient obstacle avoidance algorithm, this mechanism is able to accurately represent environments through point clouds and construct obstacle-free paths to a destination, in a small timeframe. A prototype mechanism has been installed on a quad copter for visualization on how actual implementation may take place². We describe experimental results based on this prototype.