

Simultaneous Wall Following and Map Building Robot

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In this research, an autonomous differential drive mobile robot is proposed to follow the wall on its right side, while avoiding any obstacles on its way and builds the map of the moved path. The importance of the study is that it can be used in a quarantined building where it is unable to send a human directly, but is important to send some device to collect information about the area. The proposed method can also be used to replace prevailing automated guided vehicle (AGV) system. The wall following algorithm is based on the method that a person find the way in a dark building. Even though the person cannot see, the person can understand the surrounding in the hand distance by touching the wall and when the person pursues to follow the wall. The robot platform includes three ultrasonic range sensors, microcontroller board, a motor driver and a power source. The programmed microcontroller gathers the distance information of surrounding area through the ultrasonic sensors and control the individual motor speed and direction according to the open loop logic. The speed of the individual motor is controlled by the pulse width modulation (PWM) signals. The developed robot communicates with nearby computer via a Bluetooth connection to gather the relevant information such as ultrasound sensor and wheel motion data. The recorded data are used to map the path of indoor mobile for the robot navigation.

Keywords: Wall following, Mobile robot mapping, Microcontroller