

A Device-to-Device (D2D) Communication between Mobile Robots using Wireless Communication Protocol in Dynamic Environments

Abstract

Mobile robots must have the ability to guarantee safety for operation in a dynamic environment and close to other moving objects. There are many research had been conducted to make the robot safer by utilizing sensors and big data technology to make the mobile robot able to navigate autonomously and intelligently. One of the key elements in autonomous robots is communication between robots. In this paper, device-to-device (D2D) technology has been used to develop communication between robots. To establish the algorithm for D2D communications, radio frequency (RF) used as communication protocols that can perform D2D communication in real-time applications. The performance of D2D communication was then be assessed in terms of distance and latency. RF transceiver module has been mounted on the robot with Arduino to allow communication between mobile robot to other mobile robots in order to transfer data from robot's sensors to the other mobile robots. By utilizing the gathered information and data, the robot can assess its surroundings and predict the movement of other robots to avoid collisions between robots. The results show that the RF transceiver module is capable to send and receive data between two robots with latency up to 4.865s. It is envisaged that the proposed module can be very useful for developing D2D communication between robots to operate in dynamic environments.