DESIGN OF POSITION MAPPING AND WAYPOINT NAVIGATION SYSTEM ON ACKERMANN MOBILE ROBOT USING GPS SYSTEM (GLOBAL POSITIONING SYSTEM)

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ABSTRACT

Mobile robot is one of the most popular types of robot in its development. Viewed from the function, the ability of mobile robots is expected to help humans in various ways, for example the latest technology that allows sending robots to explore dangerous environments. As in this study, the author conducted research on the Ackermann mobile robot used in the navigation sector. This research was conducted with the point of executing a waypoint navigation on the Ackermann mobile robot. The prototype is outlined with the Arduino Mega microcontroller which handles the GPS module, compass sensor, and other supporting tools. The prototype additionally designed to be controlled through an application on a smartphone utilizing Bluetooth communication. In its implementation, the waypoint navigation system is used to perform path following based on the trajectory which obtained from the GPS module and compass sensor. These sensor play a part in deciding the heading, bearing and distance to reach the destination waypoint. Based on the results od the tests, several conclusions were found: connectivity between the application and the prototype will be lost if the distance is more than 25 m, the compass sensor measurement gets an average error value of 5.05%., the reading of the coordinates on the GPS module gets an average value of Euclidean error is 0.000016, the maneuvering successful rate of the prototype is 90% and the navigation system can guide the motion of mobile robot to following the trajectory to the destination waypoint with average error distance of 1.63 m.

Keywords: *Mobile robot, Navigation, GPS, Compass, Waypoint*