

ABSTRACT

Global Positioning System (GPS) technology is a technology used to determine the position of an object, i.e., coordinates, that is applicable outdoors but not indoors. Wi-Fi was considered among other technologies as an indoor navigation system because this technology is widely used in industrial areas. In this study, the indoor navigation system employs an Automated Guided Vehicle (AGV) in a small scale, represented as an AGV microrobot. Microrobot is used as a mobile robot that is expected to reach areas that cannot be reached by humans.

In this study, the system determines the position of the user based on the strength of the received Wi-Fi signal, better known as the Wi-Fi Positioning System (WPS). Trilateration method uses Wi-Fi signal strength by estimating the user's distance from each of the 4 Access Points. By using the Trilateration method, calculations are obtained to determine the position of the microrobot. The microrobot movement system utilizes the inverse kinematic method which is divided into two parts, rotational movement to calculate angles and distances, then translational movement for calculating forward movement to the destination point.

The results of this research are presented in the form of a Wi-Fi based position finding system based on the Trilateration method, which is to obtain the position of the robot. The results show a radius of detection point with a deviation up to ± 36.93 cm from the actual point. The robot driving system then use the inverse kinematic to calculate the distance and turning angle to the right distance. The movement of the robot has an angular deviation of $\pm 1.50176^\circ$ and translation movement with a maximum error of 22 cm. The whole navigation system, namely position and movement finders, produces a deviation of ± 20.166 cm from the destination point.

Keywords: *AGV, Microrobot, Trilateration, Indoor Navigation, Wi-Fi*