ABSTRACT

Information to know the location of objects or someone is one of the important things in everyday life. During this time the Global Positioning System (GPS) technology is reliable when outdoors. But when indoors, the GPS will be difficult to reach specific areas of the building due to their lack of accuracies. By utilizing Light Fidelity (Li-Fi) technology, Indoor Positioning System (IPS) has advantages in terms of accuracy and energy efficiency. But if it is associated with IPS, most usually the installation of Light Emitting Diode (LED) lamps follow the shape of the room itself, for example the square or the elongated inline.

This study discusses IPS accuracy in Li-Fi when the geometry shape of the LED lighting installation location varies. The positioning technique used is the Received Signal Strength (RSS) which takes strong receiving power as an estimate of a distance and Time Difference of Arrival (TDOA) which takes the difference in arrival time as an estimate of a distance. With the comparison of each geometry and algorithm used, the best configuration data is obtained for the implementation of IPS.

The results showed differences in the number of LEDS and geometry effect on positioning accuracy. The positioning testing of RSS and TDOA techniques shows that the geometry of the hexagon has an average of less error positioning than other geometries. The value is $1{,}53 \times 10^{-05}$ m for RSS and 2,9269 m for TDOA. This shows that more LED lights or reference points with a more tightly-spaced range can result in better positioning.

Key Words : Light Fidelity (Li-Fi), Indoor Positioning System (IPS), Received Signal Strength (RSS), Time Difference of Arrival (TDOA), Geometry.