

**INDOOR NAVIGATION SYSTEM USING DIJKSTRA'S ALGORITHM FOR
EMERGENCY SITUATION**

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UNIVERSITI TEKNOLOGI MARA (UiTM)



**MOHD FAIZULHAYAD BIN MASHURI
FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA (UiTM)
40450 SHAH ALAM SELANGOR**

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ABSTRACT

This research discuss on an implementation of route planning in Indoor Navigation System (INS) for emergency situation. Global Positioning System (GPS) cannot be used for INS since signals sent by satellites cannot penetrate the construction materials inside a building. Wireless Fidelity (Wi-Fi) is the system that can make INS possible. By implementing Radio Signal Strength (RSS) provided by Wireless Fidelity (Wi-Fi), Reference Points (RP)s with it designated RSS can be setup across the area desired. The connection or paths between each RP can be created to create the best route to the destination. The algorithm used for this route planning is Dijkstra's algorithm. The result of this technique shows higher accuracy in terms of shortest distance taken to the destination compared to other technique and the implementation of this technique are easy since users only have to manipulate the weight between each RPs according to obstacle that exist along the paths. Bigger obstacles will gives higher value of weight. Dijkstra's algorithm can provide shortest route to be used by user in a fast manner due to its medium algorithm complexity compared to the other two (2) algorithms. Dijkstra's algorithm also proved that this algorithm has the capability to provide alternative route in case of unpredicted existence of obstacles along the main route. Thus, it can be conclude that Dijkstra's algorithm is the best algorithm to be used for route planning compared to Bellman-Ford and A* algorithm.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

When discussing on navigation, most of us will think about Global Positioning System (GPS) where we locate our position and our destination by the help of the satellite. Unfortunately, GPS signal cannot be received in an indoor environment such as in buildings where the nature of the satellite signal which is straight line of signal that being obstructed by the walls and roof of a building [1][2]. Due to this constrain, the existing navigation system does not provide indoor navigation service. Google Maps, as we see, is one of the most reliable source of navigation, where Google Maps provide detailed information about any maps that we searched but one of its limitation is Google Maps cannot display the space structure and provide specific information about indoor environment of a building, despite all the technologies they used to generate real-time maps display even in 3 dimension (3D). These limitation has inspired people to develop an indoor navigation system with high accuracy and give more detailed information about indoor environment such as in a building [2][3].

A navigation service has to be consistent in providing navigation for indoor and outdoor. A consistent connection between transmitter such as satellite, to the receiver can provide