

# EVACUATION ROUTE GUIDANCE AND INDOOR NAVIGATION SYSTEM USING IOT

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**Abstract :** *With technological advancements, internet is evolving and so is the development of internet of things. Buildings are getting smarter and this trend is gaining momentum. Wireless sensor networks play a key role in this concept. This idea deals with one of the widely used applications of wireless sensor networks, that is, in the field of navigation. When an emergency occurs, wireless sensors detect the danger and directs the evacuees to areas far from it via cyber physical interaction. Emergency navigation is essential to evacuate users trapped in danger to nearby exit. Our focus is not only to guide users providing short path but also safe path. This helps in avoiding congestion as well as leads to the usage of other sub-optimal paths which are often left unused thereby improving the survival rate of evacuees.*

*We suggest Intelligent Escape, a real-time, powerful, intelligent and easy-to-use exit system with a portable interface for emergency cases like fire. Unlike previous work, we examine changing conditions and calculate a personal way who escapes by looking at his features. Intelligent Escape, fast, cheap, multi-functional and mobile supported, collects a variety of natural sensory information and takes into account survivors' signals, using implants. The neural network (ANN) calculates the risk of personal use of each link on the site, eliminates that risk, and calculates the appropriate escape way under current conditions. After that, our program guides those who are excluded from the exit through statistics a way with voice and visual commands on a Intelligent phone. The consideration about the route coordination problem in emergency evacuation of large smart buildings is taken into account. The building evacuation time is crucial in saving lives in emergency situations caused by imminent natural or man-made threats and disasters. Conventional approaches to evacuation route coordination are static and predefined.*

**Index Terms – Internet of Things, Indoor Navigation, Evacuee, Emergency, Congestion, Wireless.**

## I. INTRODUCTION

We suggest that Smart Escape, a real-time, powerful, intelligent and user-friendly exit system with a portable interface for emergency cases like fire. Unlike previous work, we examine changing conditions and calculate a personal route who escapes by observing his features. Smart Escape, fast, cheap, multi-functional and mobile-supported, collects a variety of natural sensory information and takes into account the characteristics of survivors, using implants neural network (ANN) calculates the personal use risk of each link in the site, removes that risk, and calculates the appropriate escape route under current conditions. After that, our program leads those who are excluded from the exit through the calculations route with voice and visual commands on the Smartphone.

Emergency navigation is it is important to get rid of users trapped in the immediate exit. Our focus is not only on directing users who provide a shorter route but also on a safer route. This helps to avoid congestion and leads to the use of alternatives that are often left unused thus improving the survival rate of survivors.

There is a problem linking the route to the urgent eviction of large smart buildings. The timing of evacuation is important in saving lives in emergencies caused by natural or man-made threats and disasters. The most common methods of linking the expulsion route have been prepared and described in advance. The consideration about the route coordination problem in emergency evacuation of large smart buildings is taken into account. The building evacuation time is crucial in saving lives in emergency situations caused by imminent natural or man-made threats and disasters. Conventional approaches to evacuation route coordination are static and predefined.

## II. LITERATURE SURVEY:

“Mobile Fire Extraction Program for large public buildings based on Artificial Intelligence and IoT”.[1] In this case, artificial intelligence technology is used to build an efficient and logical solution, solution model, and the smart mobile migration system is designed for large public buildings based on artificial technology.

“IoT system based on Intelligent Fire Evacuation System”, [2] In this paper, an IoT fire-based system is developed that directs people on the way out in the event of accidents. The search algorithm was used control the central module of the proposed model. This helps people get out of danger by directing a short, safe route.

“RFID-Based Hybrid Building Fire Evacuation Program on Mobile Phone”, [3] In this work, a hybrid building evacuation system (HBFES) on a mobile phone using Radio Frequency Identification (RFID) techniques has been developed. Location Based Service (LBS) and many existing computer or mobile applications used in the system to quickly calculate reliable exit routes in the event of a fire.

“Mobile Fire Evacuation System for Large Public Buildings Based on Artificial Intelligence and IoT ”, [4] In this, the artificial intelligence technology is used to construct an efficient and intelligent dynamic evacuation path solving model, and an intelligent mobile terminal fire evacuation system was built for large public buildings based on artificial intelligence technology.

“Building Fire Emergency Detection and Response using Wireless Sensor Networks”, [5] In this paper, there is an overview of work in two areas: protocol design for robust network operation, and sensor driven evacuation.

### III. PROBLEM DEFINITION

There is the route coordination problem in emergency expulsion of large smart buildings. The building expulsion time is crucial in saving lives in emergency situations caused by immediate natural or man-made threats and disasters. Conventional approaches to expulsion route coordination are fixed and predefined.

### IV. PROPOSED SYSTEM:

The main use cases for the proposed system is that an evacuees in a building under fire should be able to receive an emergency response at the time of fire on their mobile phone. In addition to this evacuees should be able to see a danger map on the mobile phone that shows them where the fire is in the building and accordingly provide the safest and the shortest route to the exit path.

This system consists of two parts.

- i) Software Module
- ii) Hardware Module

The data from the sensors of hardware is passed to the software through the server. The software module performs the necessary operations and helps the evacuees to rescue from the place safely.

### V. METHODOLOGY

Smart systems that are deployed in buildings increase user comfort and management of building resources becomes more efficient. These systems are referred to as building automation systems (BAS). Automated management of functions like heating, ventilation, lighting, security, and energy management is provided with BAS by using hardware and software-based techniques.

The Emergency Evacuation Service model is proposed as part of the BaaS project and details of this model are explained. At emergency situations, especially in densely populated buildings, evacuation of people to safe places is a very challenging task because of complexity of the building floor plans. An emergency service is targeted in this study in order to solve this issue.

### VI. MODULE DESCRIPTION

**User login:** For login to the system, user will enter the Username and password, if entered details are correct then the system will redirect him to home page otherwise it will show an error message.

**Registration:** The user will register to the system with normal information. At the time of registration, password will be auto generated and it will be provided to user's mail.

**Prediction system:** It will predict the path based on the indoor positioning system. It will help if any of the path is block.

**Hardware:** In this part sensor will check if any of the threshold level is crossed. If crossed buzzer will start.

### VII. SYSTEM ARCHITECHTURE:

The users equipped with mobile phones or PDA's interact with the sensors through Wi-Fi.

Wi-Fi is a technique used for location tracking with wireless access points (AP's).

On occurrence of hazardous accidents like fire or gas leakage, sensor value set goes beyond threshold and emergency is triggered. The centralized control/sever has the location details of the building (for path navigation and also mapping details to exit).

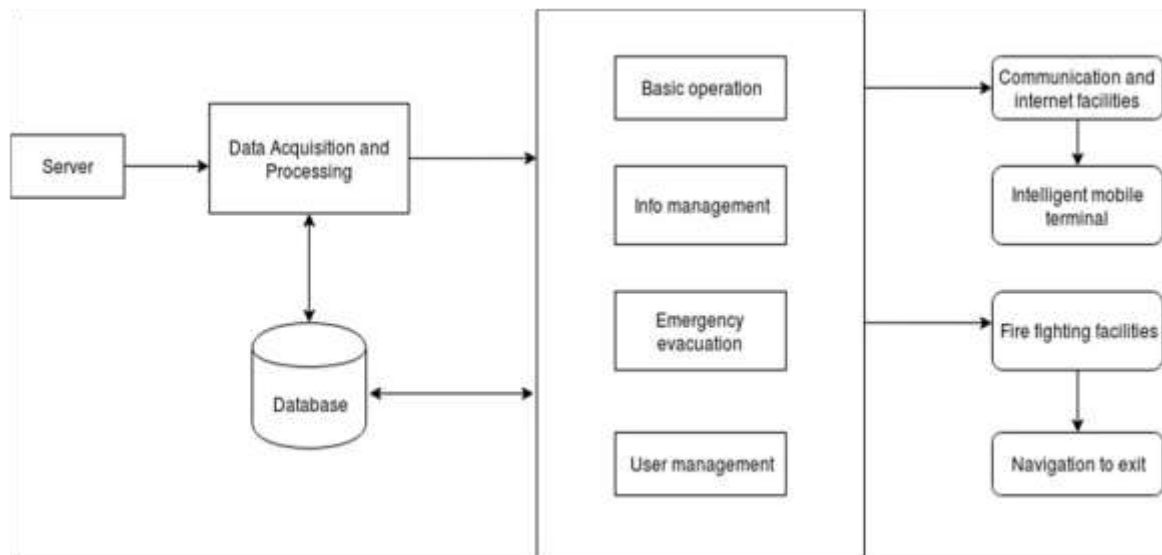


Fig 1: System Architecture

## VIII. CONCLUSION

The users equipped with mobile phones or PDAs interact with the sensors through Wi-Fi. GPS is inadequate for indoor location positioning. Wi-Fi is a technique used for location tracking with wireless access points (AP's). Based on the range of wifi we can predict the current location of user in the indoor. Based on the current location we can show the exit location using ant colony algorithm which will tell shortage and safest route to exit. This project helps in the exit of the user from the flat or company etc. Hardware will be used to detect the fire.

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