

Emergency locator system for defense using WPAN and IoT

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ABSTRACT

For every country of the world, it is very essential to have a defence service, so as to sustain its survival and existence in the world., Defence also plays a very vital role in maintaining the global decorum among the countries of the world. In regards to this fact, here is the introduction of the Emergency locator system for defence using WPAN and IoT. This system will help in ensuring the safety of every user by providing the reply signal to the end user for the same. This system works in WPAN spread spectrum via ZigBee Transceiver Module, which ensures the security of the message signals with higher RF range. As a consequence of which it is impossible to breach the message signal and hence communication remains secure.

Keywords: Zigbee Transceiver, WPAN, RF(Radio Frequency).

INTRODUCTION

The Emergency locator system is a system which consists of two nodes :Transmitter node and Receiver node. The transmitter node will consist of a zigbee transmitter, a power supply, a microcontroller, a switch array and a seven segment display. This transmitter node is also known as the Locator node. The receiver node will consist of a zigbee transceiver, a power supply, a microcontroller, a seven segment display, and a switch. This receiver node is also known as the Master Control node.

This system will work as a communication system between locator and master control node. In this system, every individual locator will be provided with the zigbee transmitter for providing the encoded message signal to the master control unit, which consist of zigbee receiver , which will then receive the message signal from locator

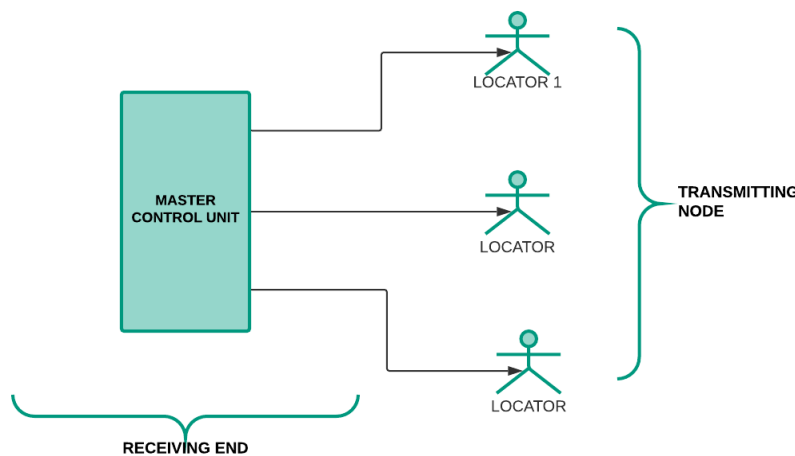
and in return will send the message to the locator in order to ensure the safe condition in the respective area or zone.

REVIEW OF LITERATURE

This system describes a system which comprises a GPS tracking module and also an application for informing the source person in emergency cases with the help of a push button. With the help of this system one can know about one's information without any necessary activity to perform. It makes the system reliable and efficient enough to reduce the crimes and also decrease the response time.[1]

Under this system, ability for detecting the status of the device in the real time, also design of the system is simple and non-interfering, and the operating the tasks safely with least error is possible with this system. Thus it reduces the complexity and enhances the performance in dealing with the tasks and old practice paper works [2]. This describes a scheme, based on the positioning of a zigbee device. It describes under four types of flows, first is creating a fingerprint table of the location, second is to train the acquired data in the first step using neural network, third is pre-processing of the data with the help of signal index pair method and fourth step is estimation of the target in the mobile state. This system can be useful in area of patient tracking situations, object tracking, and etc.,[3]. In this chapter, it's been described about data fusion techniques. It is used to take more reliable and accurate data. It describes the fusion algorithms of data in the zigbee application layer. Due to this data fusion techniques zigbee applications can be vastly increased with the help of more efficient techniques.[4] In this paper, it's been described about the OPNET modeler, with the help of which it is easy to study the network created with the help of zigbee protocol. These networks are sometimes mesh networks on which a mesh routing algorithm has been applied for efficient results. Sometimes these results differ in performance when locations of the trajectories of the coordinator are in variable values.[5] In this paper, it has been described by a zigbee protocol, low-power, low-rate, wireless communication defined in the standard of IEEE 802.15.4 and discuss many defence techniques against attack in zigbee devices also known as PIP in TinyOS.[6]. Under this article it has been described about jamming in wireless sensor networks and its relevant study including the protocols used for communication. There is also an overview about jamming techniques against wireless sensor networks. It is presented here about, existing security mechanisms against jamming attacks are pointed out.[7]

METHODOLOGY

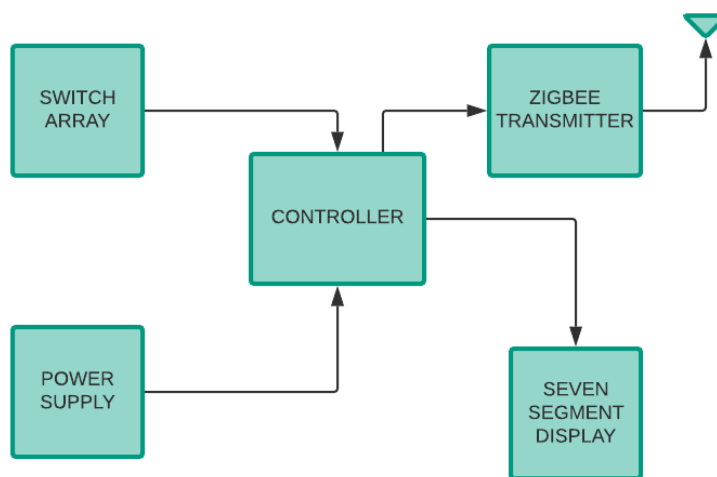


In the figure1.1, block diagram of of the emergency locator system, there is one master control unit and

FIG-1.1-BLOCK DIAGRAM OF THE SYSTEM

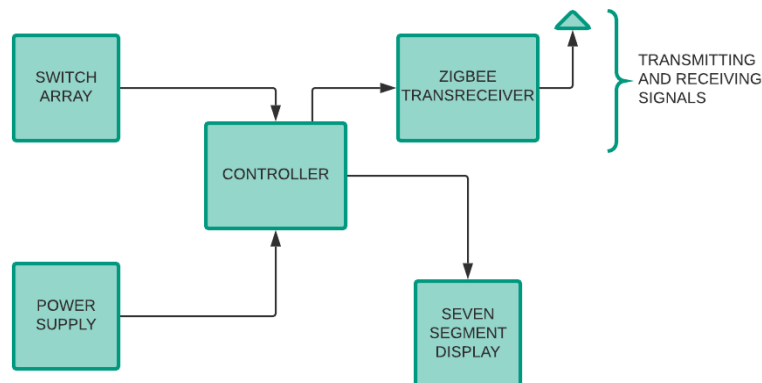
A locator unit in transmission and reception of RF signals take place, for ensuring that the locator is in the range and also there is no matter of concern or situation of causality.

TRANSMITTER NODE



In the above figure-1.2 it consists of a microcontroller, a zigbee transmitter and a seven segment display. At this node, transmission of message signals via a zigbee transmitter takes place to the master control unit. These message signals are further received by the master control unit with the help of a zigbee transceiver.

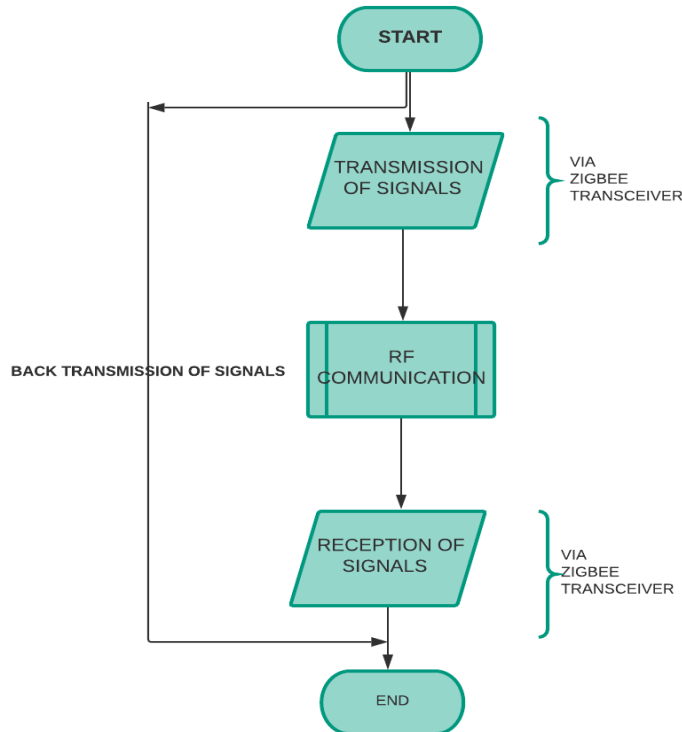
RECEIVER NODE



- In the above figure-1.3, it consists of a microcontroller, a zigbee transceiver and a seven segment display. At this node, receiving and back transmission of messages take place via master control unit with the help of a zigbee transceiver which works at RF(radio frequency) communication.
- This back transmission of the encoded signal from the end receiver unit or master control unit to the locator unit ensures that there is no matter of concern regarding the individual locator or end user.
- Further, this type of communication can take place in a short range network of 1 kms and maximum upto 2kms in static state of the system.

SOFTWARE DEVELOPMENT

In the below mentioned figure-1.4, the system has been described in two modes transmission and reception of message signal, at the transmission end also known as locator unit ,message signals is transmitted via RF communication from Zigbee transceiver which is further received by the zigbee transceiver at the receiver end also known as master control unit. In this process, signal transmission takes place under range of upto 1km and in static state, range is of 2-3 km.



RESULTS AND DISCUSSION

- The emergency locator system can prove to be an effective solution for short range communication. Also, communication is of RF range under spread spectrum so data breach is not easy in such cases.
- WPAN(Wireless personal area network) is the type of communication network used here so as to provide wireless communication within the range of 2.4GHz as decided by IEEE standards.

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