

Patient Information Monitoring and Emergency calling System using LoRa

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Abstract – Patient Information Monitoring is a pivotal to avoid errors and conflicts. This system captures the patient physiological data like Temperature, Blood Pressure, Pulse rate, Respiration level, Sugar etc., and sends this extracted data to the display which is placed in the individual admitted patient room. Also it support wireless panic switches to alert the critical condition of patients through LoRa and STM32, thus Nurse Common room have display unit to take immediate action, if it show signs of becoming patient's worse case can help to avoid serious problems.

Key Words: STM32, LoRa, Patient Information Monitoring, Data Capture, Alert, Display

1. INTRODUCTION

The proposed system combines the patient's wireless information monitoring and emergency alert using LoRa Technology. This system rectifies the now a day issues in hospitals like data conflicts and collapse. This system is used the doctor to better understand of Patient physiological data without hurdles.

2. MOTIVATION

In our day to day life, all faces an acute problem in hospitals, the patient's information collaboration issue. For accuracy it will be implementing by wire connection thus increases the system cost and complexity. So implement by using wireless via LoRa can increase system performance and reduces the cost. Examining these current situation, a system is designed which reduce the complication of information monitoring by implementing new ideas to the existing one

3. PROPOSED METHOD

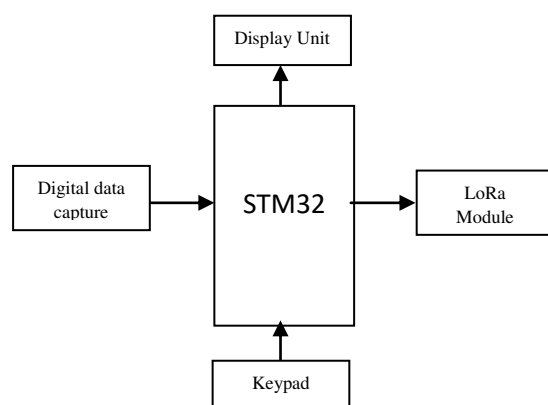


Fig -1: Block diagram of digital data capture

This proposed system deals with the simplification of procedure followed by the nurse and doctor in the hospital to collect accurate database and individual display unit of patients, panic alert intimations.

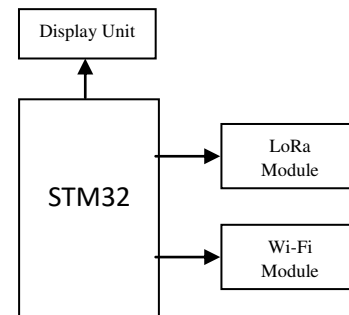


Fig -2: Block diagram of patient room display

The above Block diagram describes the whole function of information monitoring. Thus the capture data block having LoRa Transceiver to transmit captured data to the patient room display unit. Hence patient room have LoRa receiver to receive the digital data. Individual patient room having this digitalized board to display patient's information's accordingly.

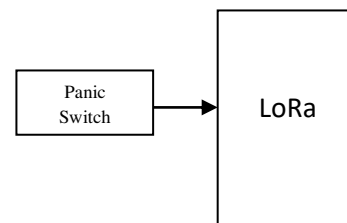


Fig -3: Block diagram of panic switch

The above Block diagram is the panic alert intimation of the patients, this panic switch is wireless to notify the patients critical condition. Which is placed in patients regularly used areas like bed, rest room, sitting chair, fall detection etc.

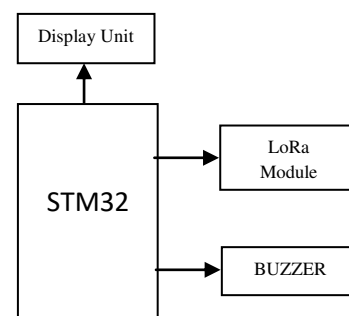


Fig -4: Block diagram of Nurse common display

This information is sent to the nurse common room to take immediate action, the common room having display unit thus notifies the patients calling information. Buzzer intimation also added to intimate patient's danger alert.

Nurse Call systems are very important for any medical center, ICU, hospital, thus affecting indirectly the patient's life. The basic idea of this system is to design and implement a complete wireless nurse call system in the hospital, displaying the patient room number on a display unit placed in Common room to avoid medical assistance delay. Our proposed system implements a smart controller and several wireless switches using LoRa technology to continuously monitor and display the state of any room, patient, medical help or assistance needed, in order to provide fast and respectable medical service without any human errors or delay, which could occur at any instant of time during system preparation or installation. Our system has succeeded in monitoring up to 5 rooms at the same time collecting real-time data as a prototype. It can be extended to up to 1023 monitoring points.

3.1 HARDWARE COMPONENTS

3.1.1 STM32

The STM32 is a family of microcontroller ICs based on the 32-bit RISC ARM Cortex-M33F, Cortex-M7F, Cortex-M4F, Cortex-M3, Cortex-M0+, and Cortex-M0 cores. STMicroelectronics licenses the ARM Processor IP from ARM Holdings. The ARM core designs have numerous configurable options, and ST chooses the individual configuration to use for each design. ST attaches its own peripherals to the core before converting the design into silicon die. The following tables summarize the STM32 microcontroller families.

3.1.2 LoRa

LoRa is a 'Long Range' low power wireless standard intended for providing a cellular style low data rate communications network. Aimed at the M2M and IoT market, LoRa is ideal for providing intermittent low data rate connectivity over significant distances.

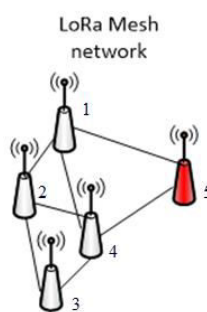


Fig -4: LoRa Mesh Network

Table -1: LoRa comparison table

Parameter	Comparison	
	Wi-Fi	LoRa
Frequency Band	2.4GHz	868(EU)MHz
Spectrum	Unlicensed	Unlicensed
Data Rate	100-300 Mbps	125-500 Mbps
Range	30-100 m	Up to hundreds of kms

3. CONCLUSIONS

In this system, I have provided the sub-nodes based on LoRa communication and the main node combining with Wi-Fi module and LoRa Transceiver to maintain database in server. In real scenarios, this system ensure the achievement of wide-area information monitoring under stability

FUTURE ENHANCEMENT

Moreover I will improve the algorithm designs in software and more algorithms to enhance the performance and functionality of the System.

ACKNOWLEDGEMENT

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