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# EMERGENCY DATA BROADCASTING IN REMOTE LOCATION WITHOUT INTERNET

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***Abstract*. This research introduces a new method for broadcasting and transmitting emergency information without internet access. The solution facilitates smooth communication over short distances by utilizing transceiver modules and wifi modules at the broadcasting end and microcontroller with any display at the receiving end. In this project Wifi module serves as both a web server and an access point during the transmission process, enabling users to enter data via a default webpage. To secure data retrieval in the event of a power outage, data is reserved. With 125 potential channels, the system offers diversity and scalability while operating on specific channels within the 2.4 GHz ISM band. To further improve network efficiency, the multiceiver feature enables several transmitters on a single receiver. By providing communities with prompt access to essential information, this creative approach tackles the pressing need for dependable emergency communication in isolated and disaster-prone places.**

***Keyword*. NRF24L01+, NodeMCU(ESP8266), Wireless Communication, Data Broadcasting, EEPROM.**

## 1. INTRODUCTION

The Internet provides constant connectivity worldwide, making it essential for daily communications in today's networked society. The enormous democratization of information access through Internet services is largely due to the economical nature of data and the unrelenting progress in technology. But even with the impressive advancements, a sizable segment of the world's population is still offline. Communities are susceptible during emergencies because basic communication infrastructure is frequently insufficient. When it comes to security concerns, public health emergencies, or natural catastrophes, it is crucial to have rapid access to vital information. Acknowledging the necessity of dependable emergency communication systems in isolated areas, this study aims to bridge the knowledge gap by putting forth an innovative approach. The goal of our project is to create a communication system that will allow people and government agencies to send and receive data during emergencies, even in the most remote areas. This data can be anything from text and voice to video and photographs. We want to create a reliable system for spreading important information in places where there is little or no access to the Internet by utilizing radio transmission along with cutting edge hardware and software solutions. This article provides an in-depth analysis of our strategy, covering our system's architecture, technique, and results. By means of empirical analysis and case studies, we emphasize how important it is to make vital information accessible at the critical moment. Our research aims to close the knowledge gap and improve the resilience of rural communities so they can better respond to catastrophes and protect people's lives and livelihoods.

## 2. LITERATURE SURVEY

In past, many systems have used various methods to communicate wirelessly. In [1], authors have introduced a hardware setup for a stable wireless remote control link using the nRF24L01+ module and STM32F103C8T6 microcontroller. Adaptive algorithms enable channel switching to counter interferences, verified through experiments showing interference effects on link stability and range. A wireless alarm system for residential areas, utilizing a Microcontroller and nRF24L01 wireless module [2], enables two-way communication between central monitoring and users, allowing prompt alarm triggering and warning issuance. The system achieves accurate and timely warnings through rigorous experimentation. Two wireless communication solutions are covered in this study. First of all, it showcases a flexible controller unit that emphasizes price and ease of deployment by utilizing an Arduino Pro Mini and the nRF24L01 wireless module for remote equipment control. In order to address communication breakdowns during

emergencies, it also suggests using ESP8266 in a mesh network solution. This allows smartphones to connect autonomously, and a mobile app enables user engagement, including chat capability, for efficient communication during disasters [3], [4]. A method for securely erasing data stored in EEPROM, reducing the risk of data residue that threatens information security [5], introduces EEPROM chip destruction circuits to ensure complete data erasure and chip destruction. This approach addresses the need for enhanced information security across various fields. The disclosure in [6], is concerned with a driving technique, an OLED display panel, and a display device. It draws attention to the fact that both high and low voltage supplies are provided to every shift register unit in the panel. Significantly, shift register units have different voltage differences between these supplies, which is essential for maintaining the display's effective operation. In the publication [7], a wireless communication module made up of a display module, a key module, and a nRF24L01 radio frequency module is presented. This study presents a utility model in the realm of communication technology. The nRF24L01 radio frequency module allows data exchange between these submodules, making it a flexible communication tool. On the other hand, the thesis covered in [8] seeks to assess a communication system created especially for Bidi Bidi, the world's second-largest refugee camp. This system focuses on giving refugees vital information, like notifications about tainted water sources or the presence of food at particular areas. The goal of this communication solution is to promote the safety and well-being of the refugee population in Bidi Bidi by improving the dissemination of essential information. Firstly the goal of the thesis is to develop a wireless transmission module that is energy-efficient, dependable, and economical for use in laboratories. It must also satisfy a number of requirements, including overall dependability, extensibility, availability, and resistance to interference. The nRF24L01+ transceiver module and the ATmega8L microcontroller are chosen for development after a variety of transmission standards and modules have been assessed. In second the Important signals are broadcasted to every node in wireless sensor networks, and sensor nodes periodically gather and send data to a base station. Energy efficiency in networks with limited power is a difficulty due to the high battery power consumption associated with data gathering and broadcasting operations. In order to reduce the amount of energy used during data transmission [9], [10].

## 3. PROPOSED METHOD

It is essential to set up dependable emergency communication solutions in areas with little or no internet connection. The main goal of this suggested approach is to use NRF24L01+ modules to make data transfer between remote locations and centralized receiving stations easier. This approach uses the Node MCU and Arduino Nano platforms in conjunction with additional parts like OLED panels and EEPROM to facilitate the efficient transfer and reception of critical data in emergency situations.

### 3.1 Data Transmission:

Node MCU interfaced with NRF24L01+ modules is used by the transmitting side. Node MCU facilitates data transmission from any desired device within its range by serving as an access point and web server. Using a web interface provided by Node MCU, users can enter messages. These messages are then reliably kept in EEPROM in case of a power outage. Wireless communication between the sending and receiving ends is made possible by NRF24L01+ modules.

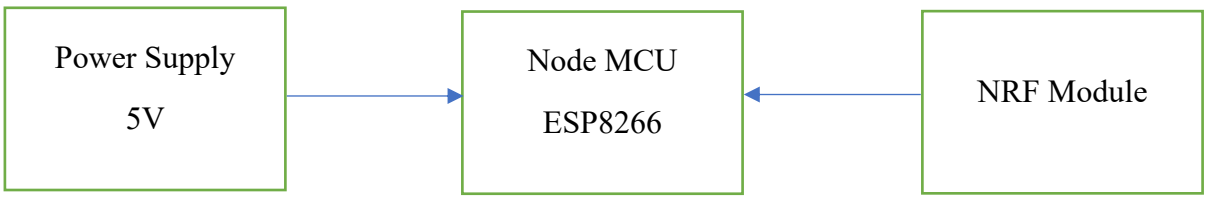


**Fig1 Block Diagram of Transmission end**

**3.2** Data Receiving and Broadcasting:

NRF24L01+ modules, OLED screens, and an Arduino Nano is used at the receiving end. Data transmitted at the transmitting end is received by the NRF24L01+ module, which broadcasts it for instant viewing on OLED screens. Within the 2.4 GHz ISM band, the NRF24L01+ modules function on designated channels to provide dependable communication within the allotted frequency range.

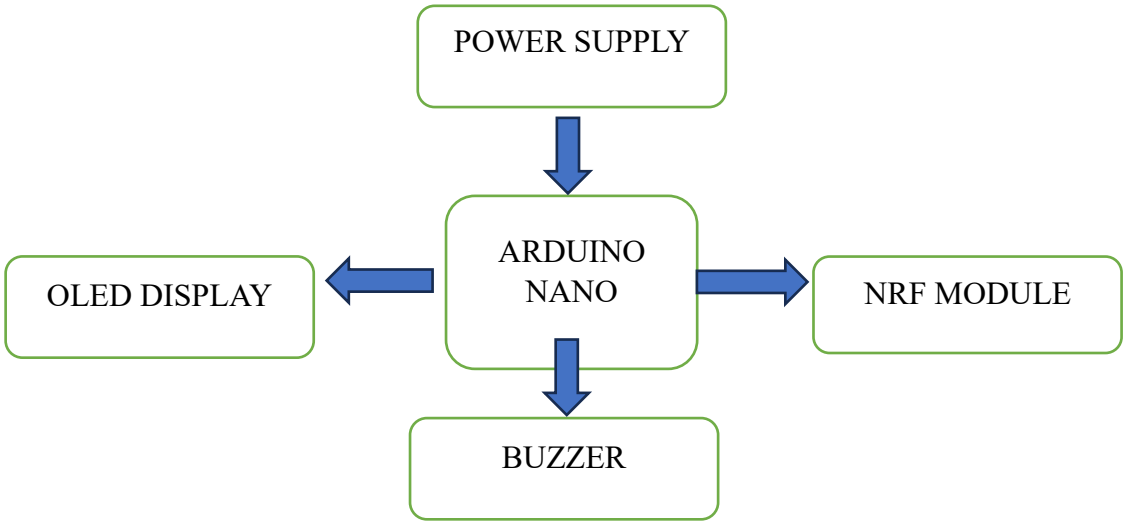
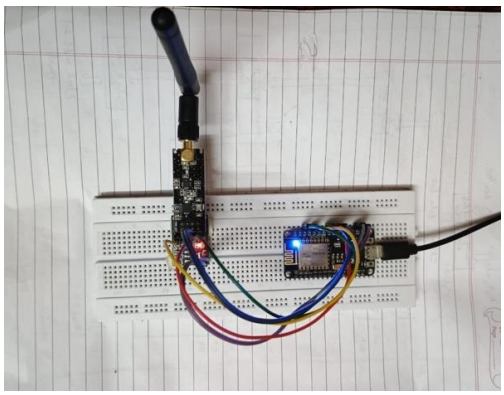



Fig2 Block Diagram of Receiver end

Using NRF24L01+ modules, our suggested solution offers a thorough approach to emergency data broadcasting in remote areas. This technology offers a dependable and affordable way to broadcast and receive vital information during emergencies by combining the Node MCU and Arduino Nano platforms with EEPROM and OLED panels. In order to meet the changing communication needs of remote communities, future research and development efforts might concentrate on improving data security, expanding the scalability of the suggested approach, and optimizing system performance.

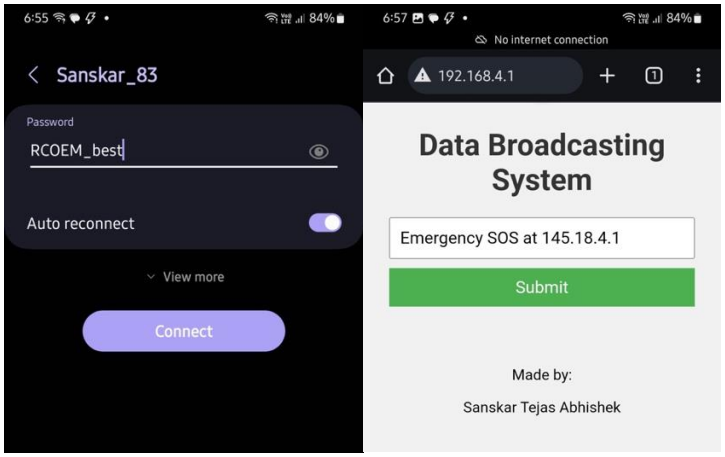
3.3 Performance Analysis

As soon as a device within the access point's range (i.e., 50 m) expresses interest in connecting. (1), Now, the user can see a wifi on the connected device with the name "Sanskar_83" (in this case). It requests the password, which in this case is "RCOEM_best." Following a successful password entry, the device establishes a connection with the node MCU. The user must launch any web browser on the device connected to the NodeMCU after establishing a connection. (2), There, they must enter the default IP address (192.168.4.1), which ultimately points them to the web page. (3), The data where the user needs to address it is "Emergency SOS at 145.18.4.1," which is what we have used in this instance. Additionally, data transmission starts as soon as the user hits the submit button. (4), Additionally, an OLED panel broadcasts the emergency data, in this case "Emergency SOS at 145.18.4.1."

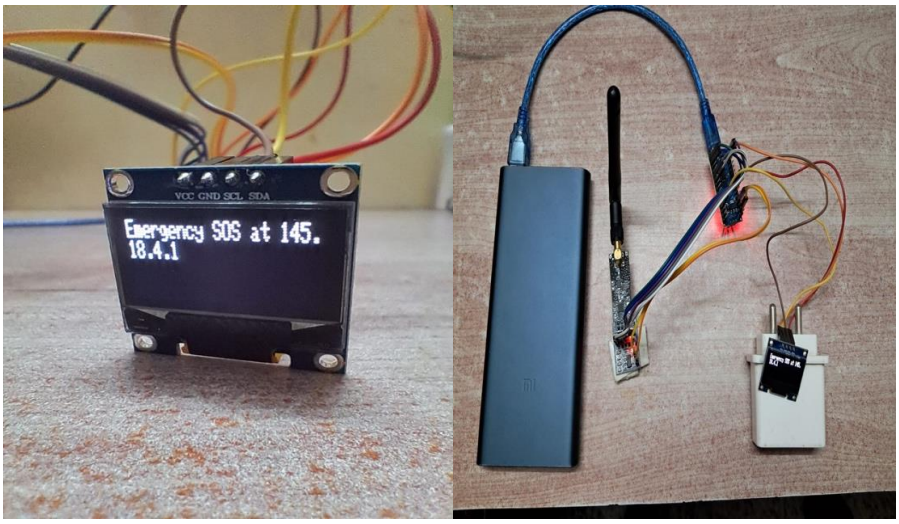


(1)

Fig.3. Transmitter End




(2) (3)




(4)

Fig.4. Receiver End

## 4. Results

The successful implementation of the hardware module, including its specifications, power efficiency, and robustness for remote deployment. Presents the key features and effectiveness of the data broadcasting protocol, including its error-checking, data integrity, and security measures. Describe the design and functionality of the software interface, emphasizing its user-friendliness and ease of use. Share the findings of range testing, interference testing, and resilience to adverse weather conditions. Discuss the system's performance and its ability to deliver timely emergency information. Discuss the tangible impact of the system on remote communities, highlighting any case studies, feedback, or data that demonstrate how it has contributed to saving lives and minimizing the impact of disasters

## 5. Conclusion

No matter where they live or whether they have access to the internet, our technology makes it possible to send vital information to isolated and disconnected areas, guaranteeing that communities and individuals receive life-saving information. As disasters can happen anywhere and at any time in our increasingly uncertain world, our effort makes sure that nobody is left behind. It proves that we have the means and the desire to help people in need wherever they may be. It is a monument to human creativity and compassion.

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