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Power Failure Detection System and Intimation over Internet

V.Saritha[1], A.Ramashankar[2], K.Laxmiprasanna[3], P.Suma[4] and S.Gouthami[5]
[1]Assistant Professor, Department of Electronics and Communication Engineering, Teegala Krishna Reddy Engineering College, Hyderabad, Telangana, INDIA
[2]Student, Department of Electronics and Communication Engineering, Teegala Krishna Reddy Engineering College, Hyderabad, Telangana, INDIA
[3]Student, Department of Electronics and Communication Engineering, Teegala Krishna Reddy Engineering College, Hyderabad, Telangana, INDIA
[4]Student, Department of Electronics and Communication Engineering, Teegala Krishna Reddy Engineering College, Hyderabad, Telangana, INDIA
[5]Student, Department of Electronics and Communication Engineering, Teegala Krishna Reddy Engineering College, Hyderabad, Telangana, INDIA

[2]Corresponding Author: ale.ramashankar@gmail.com

ABSTARCT

Electricity is a crucial and necessary aspect of modern life. Electricity is used to power appliances, computers, electronics, machinery, and public transportation systems, as well as for lighting, heating, cooling, and refrigeration.

When the electricity goes out, understanding what caused it can help you predict when it will be restored. The weather is the primary cause of power outages. Human mistake, equipment failure, and scheduled maintenance could all be factors.

As a result, we're using this project to detect power outages and notify users via a connected smartphone notification.

Keywords-- Power Failure, Power Loss, Circuit

I. INTRODUCTION

Power generation, transmission, and distribution are the three types of power systems. Because it connects supply and demand, the transmission network is regarded one of the most important aspects of the power system. When compared to other components of the power system, transmission and distribution network losses are considered to be extremely significant. The electric power infrastructure is now extremely sensitive to a variety of natural and malicious physical events, which can have a negative impact on the grid's overall performance and stability. The transmission network issue prevents power from reaching the consumer. As a result, identifying and clearing transmission network faults should be quite quick. Furthermore, there is a pressing need to upgrade the ageing transmission line infrastructure with a high-speed data communication network that can support future operating requirements such as real-time monitoring and control, which is required for smart grid integration. To detect broken transmission lines, many electric power transmission companies have depended exclusively on circuit indications. Despite the inclusion of sensors, breakers, and other communication lines, the system for fault location and clearing appears to be bigger, more expensive, and time consuming. However, pinpointing the specific position of these flaws remains a challenge. Although fault indicator technology has provided a reliable means of locating permanent faults, the current scenario in fault identification is very time consuming and tedious because the technical crew and patrol teams still have to physically patrol and inspect the devices for longer hours to detect faulty sections of their transmission lines and then have to clear the fault, which requires a more hu Wireless sensor-based transmission line monitoring addresses several of these issues, including real-time structural awareness, faster fault localization, accurate fault diagnosis by identifying and distinguishing electrical from mechanical faults, cost savings from condition-based maintenance rather than routine maintenance, and so on. These applications have rigorous criteria, such as the delivery of a large number of highly trustworthy data in a short length of time. The design of a cost-effective and dependable network architecture with a fast reaction time is critical to the success of these applications.

II. EXISTING SYSTEM

Electricity is needed everywhere, and we couldn't exist in this contemporary society without it. Electricity became increasingly important, even in hospitals, where it was necessary to save lives. And it is really important not only in hospitals, but everywhere in this increasing globe. At the same time, we are dealing with power outages and other fires. This power loss must be examined manually,

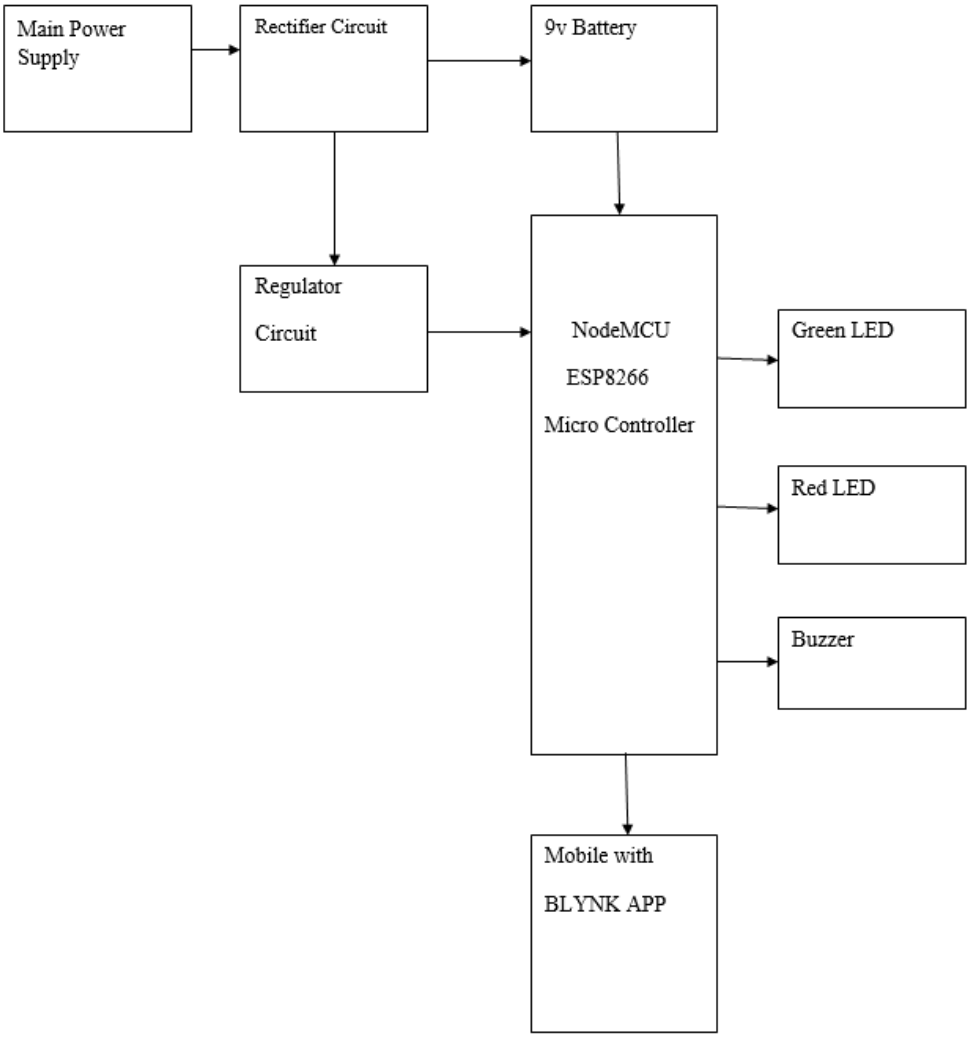
which takes a long time; in the meantime, there will be significant power loss or fault.

Disadvantages

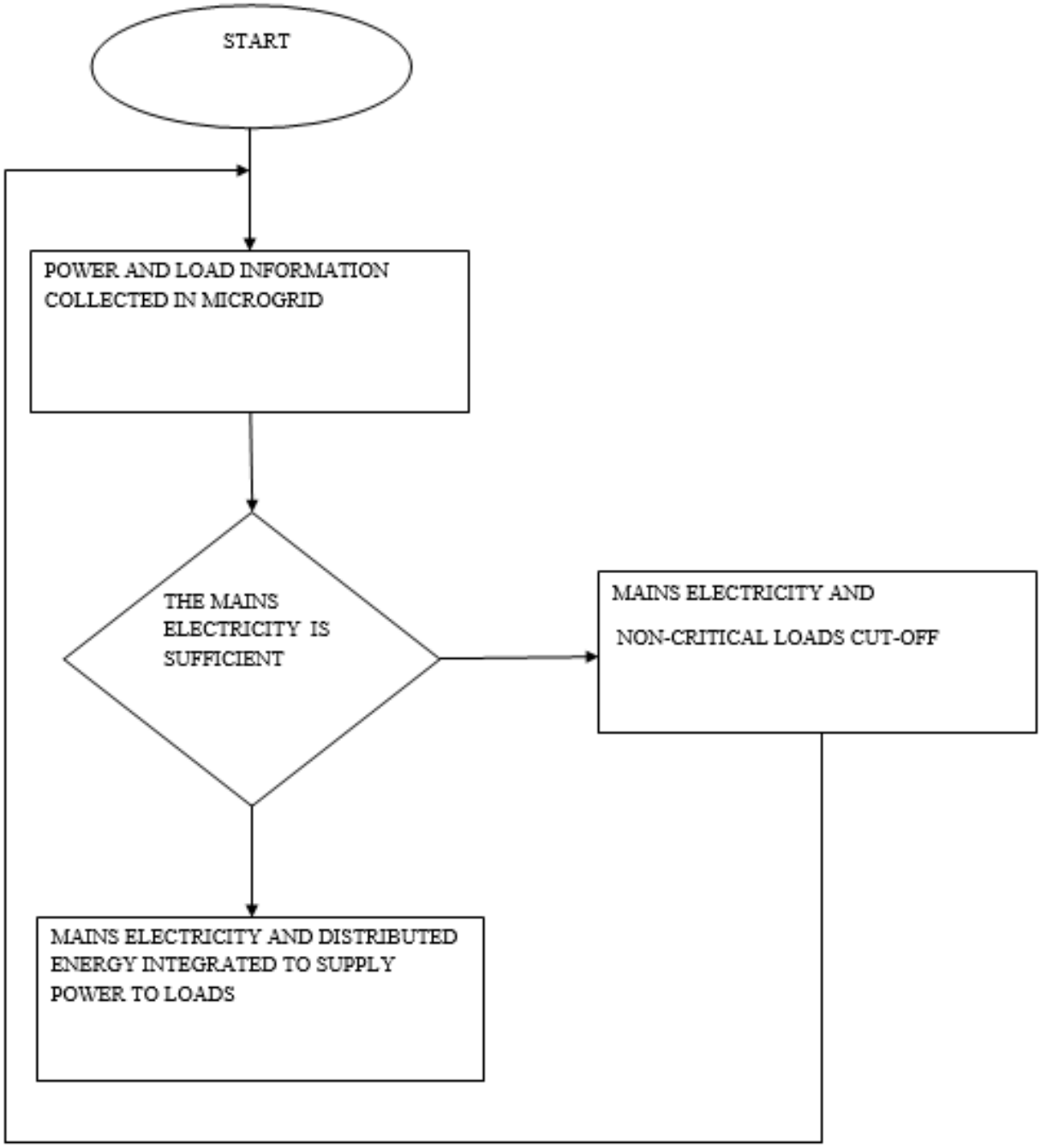
- Huge Power loss
- Waste of time in searching the fault in the System.

III. PROPOSED SYSTEM

We're using the NodeMCU Micro Controller in this system, which is an open-source firmware and development kit that helps you create your own IoT device with just a few Lua script lines. The board has many GPIO pins that can be used to link it to other peripherals and can generate PWM, I2C, SPI, and UART serial communications. The module's interface is broken into two parts: firmware and hardware, with the former running on the ESP8266 Wi-Fi SoC and the latter on the ESP-12 module. And sends the notification to our phone, which is connected to the ESP8266 through Wi-Fi. The warning will be about our power supply, since there have been or will be power outages. Our phone and the microcontroller are connected by a Wi-Fi module and the BLYNK APP, which must be installed on the phone.

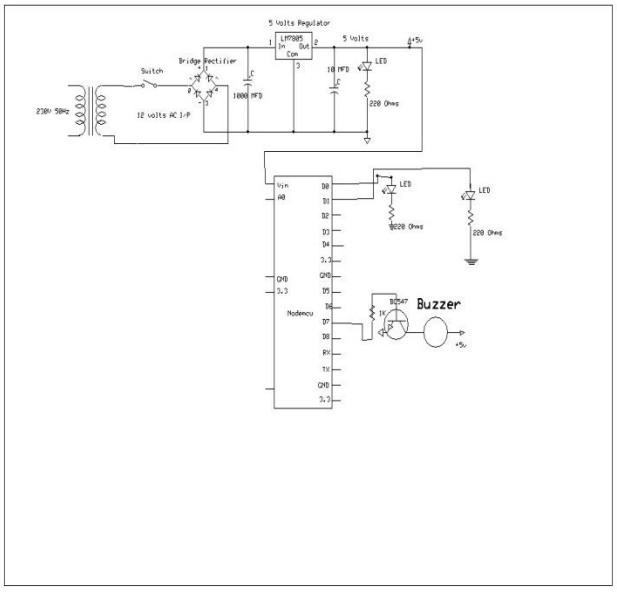


Block Diagram



Flow Chart

3.1 Schematic Diagram



IV. WORKING OPERATING PROCEDURE

4.1 Node MCU

NodeMCU is an open-source firmware and development kit that plays a vital role in designing your own IoT product using a few Lua script lines. Multiple GPIO pins on the board allow you to connect the board with other peripherals and are capable of generating PWM, I2C, SPI, and UART serial communications.

4.1.1 Node MCU Features

- Open-source
- Arduino-like hardware
- Status LED
- Micro-USB port
- Reset/Flash buttons
- Interactive and Programmable
- Low cost
- ESP8266 with inbuilt wifi
- USB to UART converter
- GPIO pins

4.2 LED's

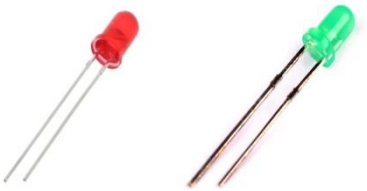
In our Project we use the LED's for indicating the faults or no faults occur in the system. Here in the project we use RED and GREEN LED's.

When current passes through a light-emitting diode (LED), it produces light. Electrons recombine with electron holes in the semiconductor, producing energy in the form of photons. The energy required for electrons to pass the semiconductor's band gap determines the hue of light (equivalent to the energy of photons). Multiple semiconductors or a coating of light-emitting phosphor on the semiconductor device are used to produce white light.
The first LEDs, which appeared as functional electrical components in 1962, emitted low-intensity infrared (IR) light.

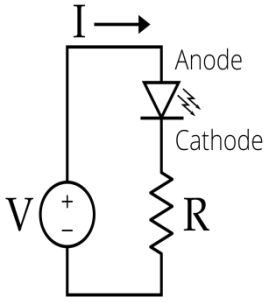
Remote-control circuits, such as those found in a wide range of consumer gadgets, utilise infrared LEDs. The original visible-light LEDs had a low intensity and were only available in red. With strong light output, modern LEDs are available in visible, ultraviolet (UV), and infrared wavelengths.

Early LEDs were commonly employed as indicator lamps and in seven-segment displays, replacing small incandescent bulbs. Recent advancements have resulted in high-output white light LEDs that can be used to light rooms and outdoor areas. LEDs have given rise to novel displays and sensors, and their rapid switching speeds are important in sophisticated communications.

An LED, unlike a standard incandescent lamp, will only light when voltage is applied in the diode's forward direction. When voltage is applied in the other way, no current flows and no light is produced. A huge current flows if the reverse voltage exceeds the breakdown voltage, and the LED is damaged. The reverse-conducting LED is a useful noise diode if the reverse current is sufficiently restricted to avoid harm.



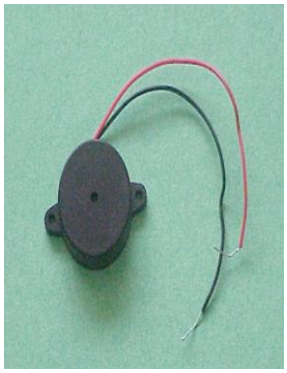
Red Led Green Led



Circuit of LED

4.3 Buzzer

A buzzer or beeper is a mechanical, electromechanical, or electronic auditory signalling device. Alarms, timers, and confirmation of human input such as a mouse click or keyboard are all common purposes for buzzers and beepers.



Buzzer

4.4 Transformer

A transformer is made up of two coils, referred to as "WINDINGS," notably the PRIMARY and SECONDARY.

Inductively coupled electrical conductors, also known as CORE, are used to connect them. A change in main current generates a change in the magnetic field in the core, which causes an alternating voltage in the secondary coil. An alternating current will flow through the load if a load is supplied to the secondary. In an ideal situation, all of the energy from the primary circuit is transmitted to the secondary circuit via the magnetic field.

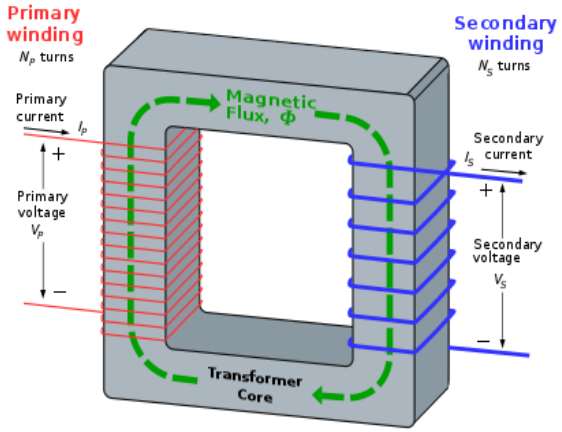
$$P_{primary} = P_{secondary}$$

so

$$I_p V_p = I_s V_s$$

The secondary voltage of the transformer depends on the number of turns in the Primary as well as in the secondary.

$$\frac{V_s}{V_p} = \frac{N_s}{N_p}$$

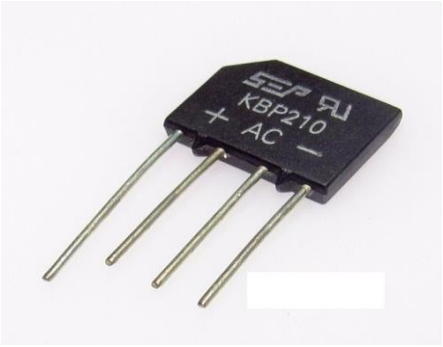


Transformer

4.5 Rectifier

A rectifier is a device that converts an alternating current (AC) signal into a direct current (DC) signal. We utilise a diode for rectification. A diode is a device that enables current to flow in just one direction, when the anode of the diode is positive with respect to the cathode, which is called forward biassed, and blocks current in the reversed biassed situation.

We use the Bridge rectifier in the system instead of the Half wave and Full wave rectifiers because it converts the full wave, i.e. both the positive and negative half cycle, into DC and does so without the use of a centre tapped transformer, making it much more efficient than the Half Wave Rectifier and much more cost effective than the Full Wave Rectifier.



Bridge Rectifier

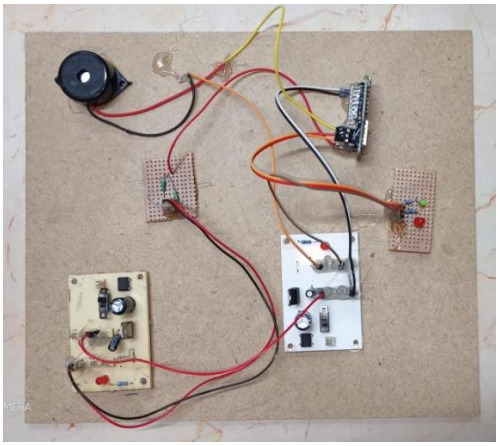
4.6 Filter Capacitor

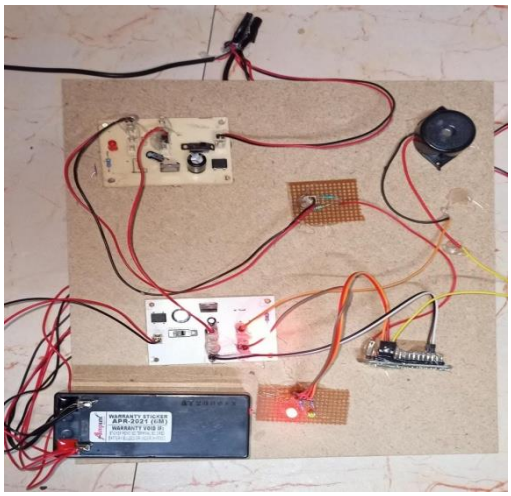
The filter capacitor is a capacitor that is used to filter out a certain frequency or series of frequencies from an electrical circuit. A capacitor, in general, filters out signals with a low frequency. These signals, which have a frequency close to 0Hz, are also known as DC signals. As a result, this capacitor is utilised to filter out undesirable frequencies. These are quite popular in various sorts of equipment, such as electronics and electrical, and can be used in a variety of applications.

Filter Capacitor

V. RESULT

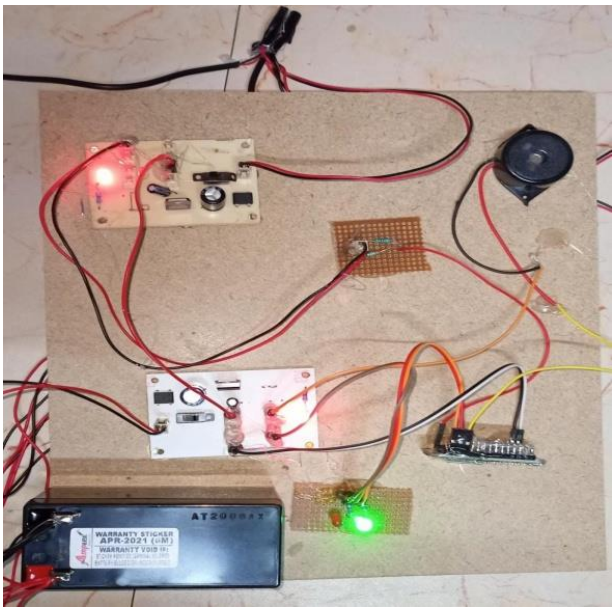
Arrangement of the System



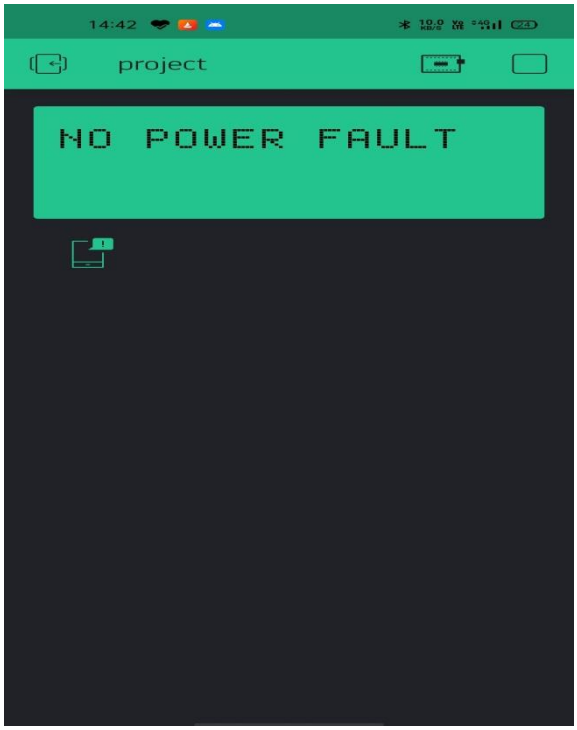


Power Fault Result

Power Fault Notification



No Power Fault Result



No Power Fault Notification

VI. CONCLUSION

The use of a wireless network for communication enables the development of a fault detection system. The primary goals of this study were met because the system developed was capable of detecting transmission faults. The instances of defects were shown, and a message was sent to the utility cell phone over the IOT network. The system was able to receive an order from the utility phone to set a short circuit limit, establishing bi-directional communication.

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V. Saritha, is currently working as a Professor in the Department of Electronics and Communication Engineering at Teegala Krishna Reddy Engineering College.

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