Breakdown EradiLORA and Server-Based Home Automation Using the Internet of Things

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ABSTRACT

The home and Society are surrounded by "things" that are connected to each other, either directly or indirectly via the internet of things. Having access to controlling these devices remotely with precision within the network when required is a key factor in the process of home automation. There are numerous aspects of this automation that needs to be developed so as to enhance it. This research gives a solution to having a precise and direct control and automatic detection of the current state of devices with the use of android applications. It also gives a practical implementation of home automation using LoRa in comparison to other technologies.

Keywords: Arduino, home automation, Lora, IOT

I. INTRODUCTION

Introduction: This "IoT-based Home Automation Project" (Internet of Things) used Lora (long-range) technology for connecting home appliances. IoT app uses the Internet for controlling devices from anywhere in the world and also gives real-time feedback to the user. Users can control devices either using buttons of the transmitter manually or IoT App using a smartphone. This project is divided into three parts first: Transmitter, second: Receiver, and third IoT App.

II. PROPOSED SYSTEM

we will make Lora Transmitter & Receiver using Lora Module SX1278 & NodeMCU ESP8266 Wifi Module.

The communication type is a point-to-point and data will be transferred wirelessly from one end (transmitter) to another end (receiver).
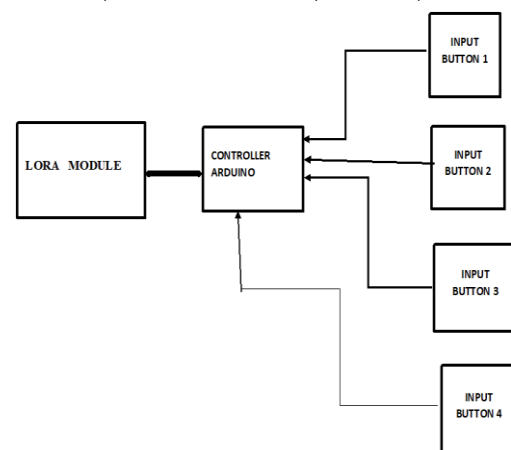

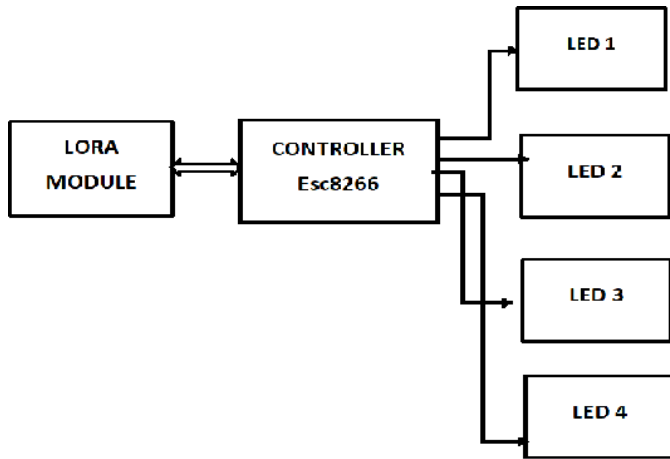
Fig 2.1 Block Diagram of Transmitter

Fig 2.2 Block diagram of Receiver

III. DETAILED DESCRIPTION

Transmitter: Transmitter has input buttons. This project used 4 push buttons directly connected to digital pins. In Arduino controller have a .in file (c program) to detect which button is pressed and according to this send a signal to the Lora module using the UART protocol. Lora module sends this signal wirelessly. Receiver: The receiver receives the signal using the Lora module. Send this signal to the ESP8266 WIFI module (Node MCU) using the UART protocol. According to the received signal controller (esp8266) take the action for (either digital pin High or Low) control device. Node MCU has an inbuilt WIFI module. This WIFI module uses a mobile or router internet connection to connect IoT apps to smartphones (Android OS). IoT app connected to cloud service which stores the current appliances or devices status (either ON or OFF)

IV.COMPONENTS USED

4.1 Lora Module

Lora Module: Then Lora 433MHz module was designed by AI-THINKER, which is based on the chip SX1278. The SX1278 RF module is mainly used for long-range spread spectrum communication. It can

resist Minimizing current consumption. Thanks to SEMTECH's patented LoRa™ modulation technology.

### 4.2 Arduino Uno

Fig: Arduino Uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino. cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits

4..3 Lora Module REYAX RYLR998 Uno

Features the Lora® long-range modem that provides ultra-long range spread spectrum communication and high interference immunity whilst minimizing current consumption.

4.4 ESP8266 Node MCU Uno
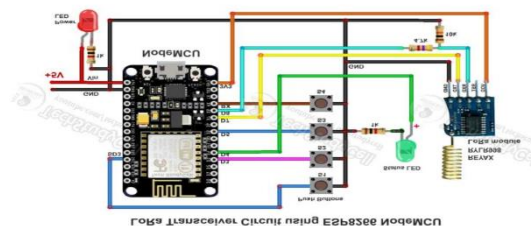
4.5 Resistor

We using 1k,4.7k, and 10k resistors in this project

a) Highly Reliable 4.7K ohm Resistor.

b) ±5% Tolerance.

• Power Rating: 0.25W.

[1] Package: Axial.

¹ Mounting Feature: Through-hole.

[1] Composition: Carbon Film Type.

A. Excellent Heat and Humidity Withstand Performance

4.6 5-mm LED

Light Emitting Diodes (LEDs) are all around us. They are in our homes, our cars, and even our phones. LEDs come in a variety of shapes and sizes, this gives designers the ability to tailor them to their products. Any time something electronic lights up, there's a good chance that an LED is behind it. Their low power and small sizes make them a great choice for many different products as they can be worked into the design more seamlessly to make it an overall better device.

4.7 Arduino Nano

Fig. Arduino Nano

• Microcontroller: Microchip ATmega328p [4]
• Operating voltage: 5 volts
• Input voltage: 6 to 20 volts

• Digital I/O pins: 14 (6 optional PWM outputs)
• Analog input pins: 8

• DC per I/O pin: 40 mA
• DC for 3.3 V pin: 50 mA

• Flash memory: 32 KB, of which 0.5 KB is used by the bootloader
• SRAM: 2 KB
• EEPROM: 1 KB
• Clock speed: 16 MHz
• Length: 45 mm

• Width: 18 mm

• Mass: 7 g

• USB: Mini-USB Type-B [5]
• ICSP Header: Yes
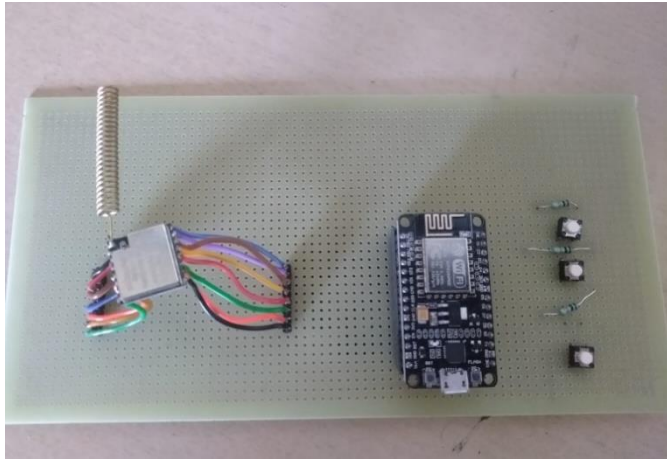
• DC Power Jack: No

V. RESULT AND ANALYSIS

Fig: Transmitter

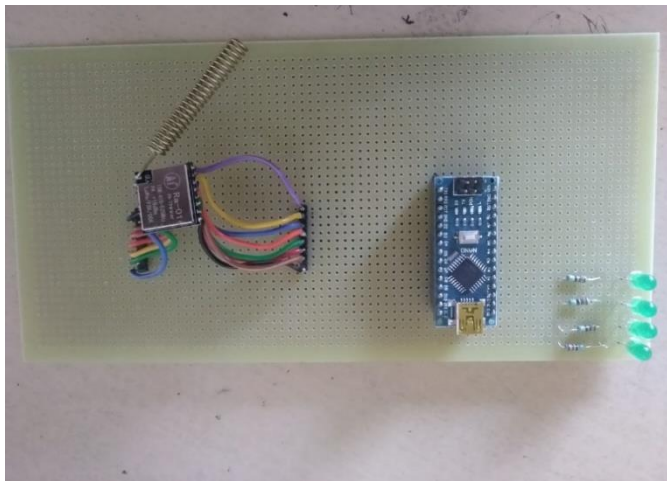Fig: Receiver

HARDWARE RESULT

VII. CONCLUSION

Technologies deployed for home automation that are available in the market are based on platforms which help to connect devices or things around the home, the key point is to make the home intelligent or smart with ease. To achieve this with precision by the use of static IP addresses and having the ability to detect the current state of devices by use of state function was achieved in this paper. In conclusion, it has been seen that home automation using internet of things over LoRa technology with the help of Android application is both user friendly and cost effective. The success rate of this model is about 95% according to results obtained from the analysis. Further work in this work shall cover aspects of cost reduction in implementation and further reduction in the power consumption of such models.

VIII.   REFERENCES

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