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LORA BASED SPEECH TO TEXT CONVERTER

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ABSTRACT

This project's ultimate goal is to convert speech at one end to text at the other. So, instead of GSM and Wi-Fi, we're using the LoRa (Long Range) module to accomplish this. The problem with those technologies is that they are limited to a certain range and also stop working if the signal is poor. To address this, we are employing LoRa technology. A LoRa module consists of a transmitter and receiver pair. The sender contacts the receiver via mobile phone. The separation between the two ends is around 1km. The speech will be converted into text and displayed on the LCD display at the receiver end. This project will aid in the development of long-distance wireless communication with low power consumption and efficient transmission.

Keywords: Lora, Low Power, Wi-Fi, Wireless Communication, Efficient.

I. INTRODUCTION

The downsides with the existing technologies like Wi-Fi, Bluetooth, and GSM, when used for information transfer, is low range and high power consumption. LoRa overcomes such challenges and it can also integrate with existing networks and enables low-cost, battery-operated Internet of Things(IoT) applications. This is a new technology but is currently on the rise. The project intends to construct a LoRa-based speech-to-text translation utilizing Bluetooth, a PIC microcontroller, a mobile phone, and an LCD display. This project has an onboard computer with several input and output ports. Microcontrollers are a frequent name for these onboard computers. Depending on the needs, the controller's input and output ports are connected to various input and output modules. In other words, the microcontroller serves as a channel of communication for all of the project's modules. There are two sections in this project: the transmitter and the receiver. Using a Mobile device and a Bluetooth application, the user can speak. The Lora module uses Bluetooth to broadcast this voice. The transmitted voice is received by the Lora module in the reception part and fed in its entirety to the PIC microcontroller. That speech will be converted into text by the microcontroller and displayed on the LCD module and the buzzer goes on indicating that the conversion has been successful.

II. METHODOLOGY

The main obstacle we faced while we are implementing this project is that the LoRa technology is a new and upcoming technology so, there were fewer resources for this. However, we went ahead with whatever resources we can find on the internet and started working on this project.

After we had the basic idea about this technology we moved to look after the rest components which are to be required in this project like the Bluetooth one, PIC microcontroller, LCD display, and other components. While implementing this we also had to keep a note of the budget so, we planned accordingly and purchased the required components. After this, we divided the work of software and hardware (like all other embedded projects) and after finishing the respective tasks we integrated them.

While testing we gradually increased the distance between both the transmitter and receiver sections and successfully recorded the results.

III. MODELING AND ANALYSIS

Components in the transmitter section include a Mobile phone for giving the speech input, one Bluetooth HC-05 module for taking the incoming signal from the mobile and transferring it to the LoRa module, and a Lora SX1276 for establishing the communication link to the receiver.

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Transmitter

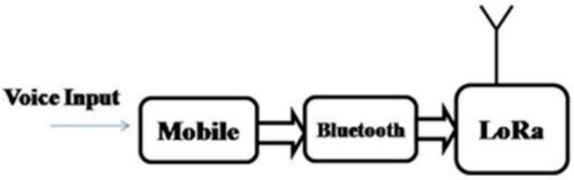

Figure 1: Transmitter Block Diagram

Receiver

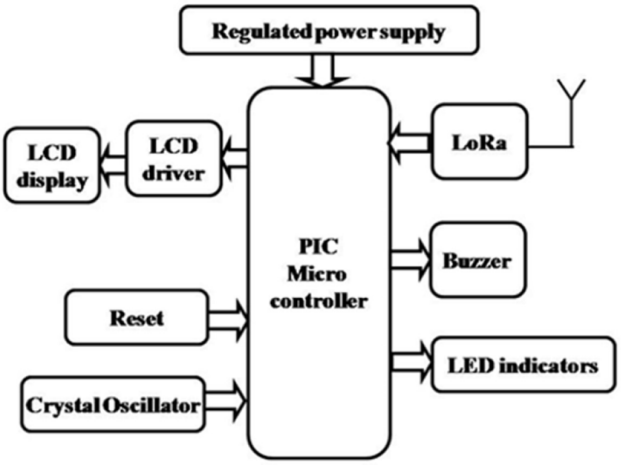

Figure 2: Receiver Block Diagram

Receiver one includes a Regulated power supply(RPS) for supplying the power to the PIC microcontroller which itself is interfaced with many other equipments like a crystal oscillator for providing the required frequency to the PIC microcontroller, LED lights to indicate whether the device is operating, LCD display for displaying the text message and a reset for resetting the microcontroller.

The software required includes a PIC C compiler for the compilation part and a PICKit 2 programmer for dumping the code and debugging it.

IV. RESULTS AND DISCUSSION

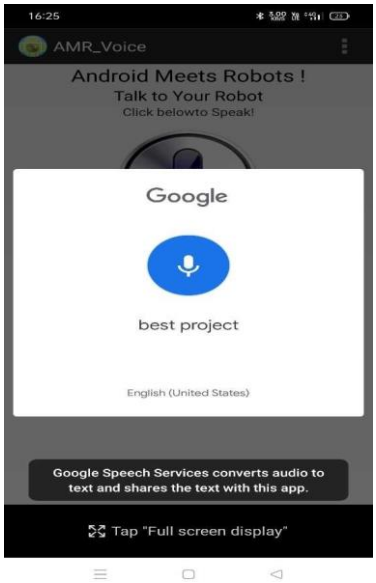

Figure 3: Voice signal given to mobile phone

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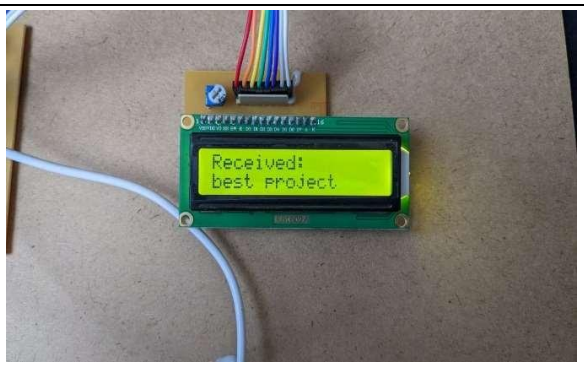

Figure 4: Received text on the LCD display

So, the conversion was successful and the message was displayed on the LCD display.

V. CONCLUSION

Though LoRa is an upcoming cutting-edge technology there are also some drawbacks to it like the low bit rate which becomes an issue if we want to transfer information that is of a large size. However, by using more advanced versions of LoRa this problem can also be eliminated. LoRa integrates easily with other technologies as we used in this project. With the help of this, the sole aim of this project which is to convert speech to text over long distances is achieved.

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VI. REFERENCES

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