FM Transmitter and Receiver Using Aurdino Unoargeable machine

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PROBLEM STATEMENT

To design and implement a transmitter and receiver system using Arduino Uno microcontrollers. The system utilises wireless communication to transmit data from the transmitter to the receiver. This project has been undertaken to demonstrate the capabilities of Arduino Uno in establishing a simple and efficient communication link between two devices.

TEAM MEMBERS

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INTRODUCTION

The purpose of this report is to present the design and implementation of a transmitter and receiver system using Arduino Uno microcontrollers. The system utilizes wireless communication to transmit data from the transmitter to the receiver. This project has been undertaken to demonstrate the capabilities of Arduino Uno in establishing a simple and efficient communication link between two devices.

The transmitter section consists of an Arduino Uno microcontroller, a wireless transceiver module, and various supporting components. The Arduino Uno serves as the main control unit, responsible for processing and transmitting the data. The wireless transceiver module enables wireless communication by utilizing a suitable protocol such as Bluetooth, Wi-Fi, or RF.

The receiver section also comprises an Arduino Uno microcontroller, a compatible wireless transceiver module, and necessary components for receiving and processing the transmitted data. The Arduino Uno in the receiver unit receives the data packets and performs any required operations based on the received information.

The implementation of the system involves programming the Arduino Uno microcontrollers using the Arduino IDE. The transmitter code includes data generation and transmission logic, while the receiver code includes data reception and processing logic. The codes are developed based on the selected wireless communication protocol and the desired data format.Testing and evaluation of the system are carried out to assess its performance and functionality. The range and reliability of the wireless communication link are determined by conducting experiments under different conditions. The data transfer rate and error rate are also measured to evaluate the system's efficiency.

IDEA GENERATION

FM Transmitter:

Audio Input: Connect an audio source (e.g., microphone) to the Arduino Uno's analog input pin. This audio source could be a microphone, line-in signal, or any other audio output device.

Audio Processing: The analog audio signal is converted into a digital signal using the Arduino Uno's built-in analog-to-digital converter (ADC). This process involves sampling the audio signal at regular intervals and quantizing the amplitude values into digital values.

Modulation: Use frequency modulation (FM) to modulate the audio signal onto a carrier wave. FM modulation involves varying the frequency of the carrier wave in proportion to the amplitude of the audio signal. You can implement the modulation process using the Arduino Uno's digital output pins by varying the frequency of the carrier wave based on the digital audio signal values.

RF Transmission: Connect an FM transmitter module (such as the SI4713 or TEA5767) to the Arduino Uno. The module will generate the FM carrier wave based on the modulated signal from the Arduino. Connect an antenna to the transmitter module for broadcasting the FM signal over the airwaves.

FM Receiver:

RF Reception: Connect an antenna to the FM receiver module (e.g., the TEA5767 or similar module) and connect the module to the Arduino Uno.

Signal Reception: The receiver module captures the FM radio signals from the airwaves through the antenna. It converts the received signals into a digital format that the Arduino can process.

Demodulation: The Arduino Uno demodulates the FM signal by extracting the audio signal from the carrier wave. This process involves detecting and decoding the variations in the carrier wave's frequency to retrieve the original audio signal.

Audio Output: Connect a speaker or headphones to the Arduino Uno's digital or analog output pins to play the received audio signal.

PROTOTYPE IMAGES