System Layout

Overview of System

We have developed a Light Fidelity System using TM4C123GH6PM as the transmitting side and Arduino as the receiving side.

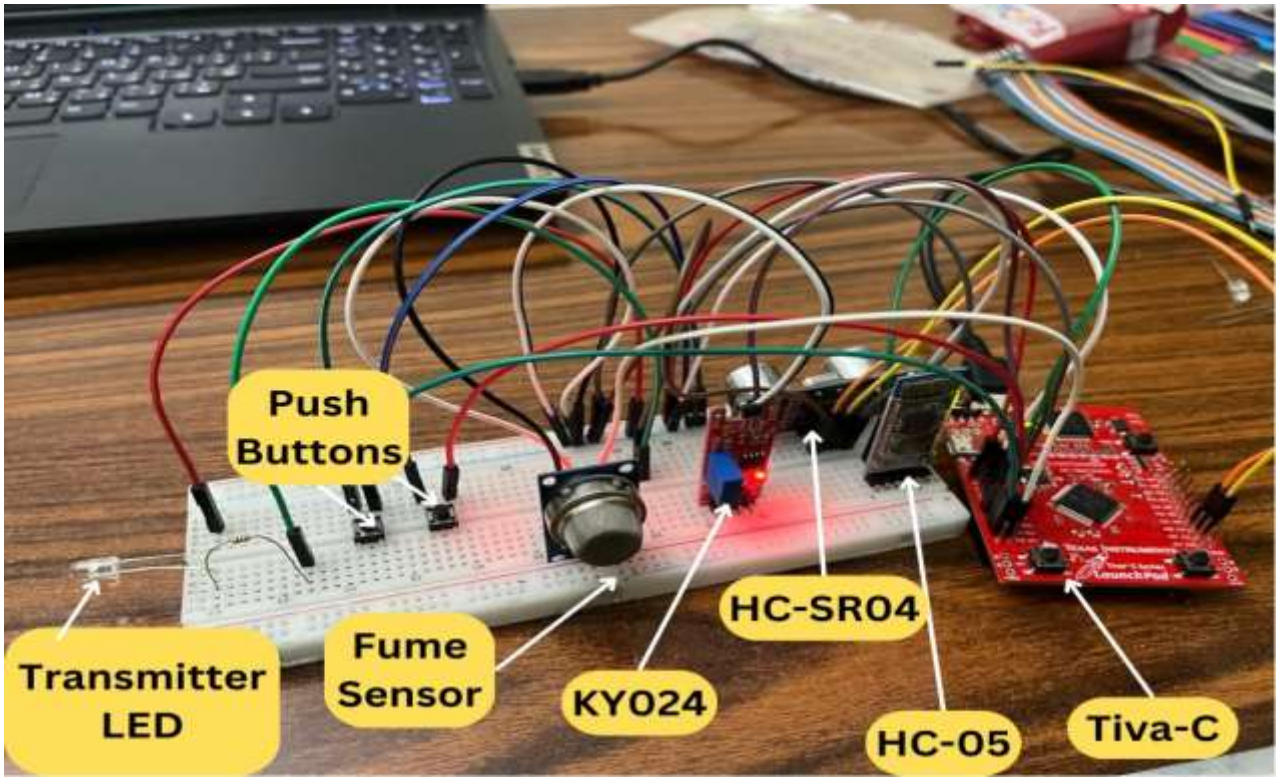
a) TM4C123GH6PM

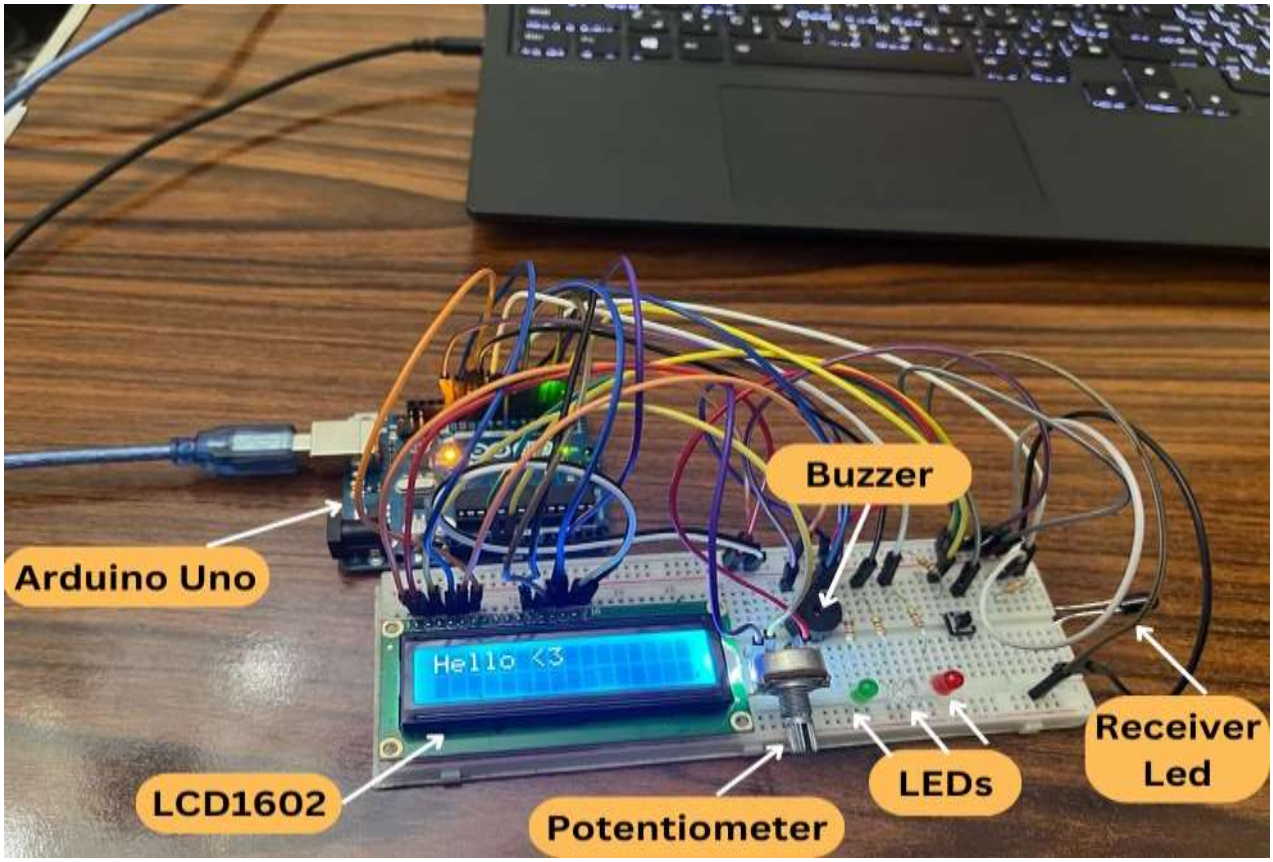
We have Connected our microcontroller with 3 sensors all ground and VCC is supplied by TIVAC ground and VCC, The first one is Fume to check for fire we have connected the Analog pin in the sensor to PORTE Pin 3 and configured this pin as an alternate function As ADC through Sample Sequencer 3, The Second one is the Ultrasonic Sensor that has 2 pins trigger pin that is connected to PORTA pin 4 as we send 10- microsecond wave and wait for the echo pin that is configured as Timer 0 capture mode to rise and capture it's rising time and wait again for it to fall and then capture the rising time then we subtract them, third one is the magnetic sensor that is connected to PORTD pin 1 to its digital pin D0 waiting for 1 to be sent When a magnet approaches the sensor, it generates a magnetic field that influences the movement of charge carriers within the semiconductor, Bluetooth module that is connected to UART5 PORTE E5 TX to send message to the developed mobile application and All of that is configured to send one's and zero's over the IR LED with patterns to indicate different sensors and finally the start and stop buttons connected to PORTA pin 5,6 As these buttons makes interrupt and make the program to leave main flow to serve this interrupt

b) Arduino UNO

The Arduino is connected to an IR receiver to receive ones and zeros sent from the transmitter LED and then it prints a warning message on the LCD that is connected to digital pins then LEDs are turned on to their corresponding sensor and the buzzer ring until the mute button is pressed that takes 5 seconds count down then stops buzzer and turn off LEDs.

Layout


Push Buttons
Transmitter LED
Fume Sensor
KY024
HC-SR04
HC-05
Tiva-C


Buzzer
Arduino Uno
Hello <3
LCD1602
Potentiometer
LEDs
Receiver Led

List Of Components

1-Arduino Uno Board

Figure 1: Arduino Uno

2-Tiva-C Board

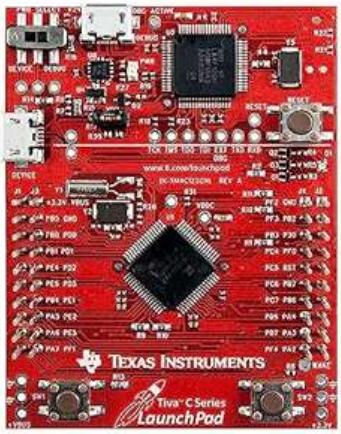


Figure 2: Tiva C

3-Ultrasonic Sensor “HC-SR04”

Figure 3: HC-SR04

4-Fume Sensor “MQ2”

Figure 4: MQ2

5-Magnetic Sensor “KY024”

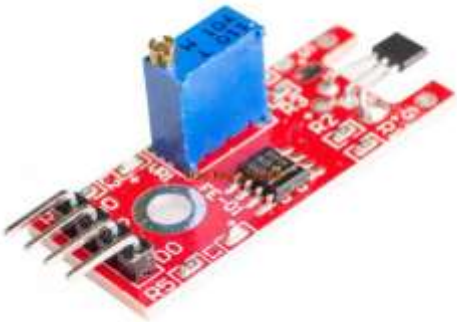


Figure 5: KY-024

6-IR Led “Sender, Receiver”

Figure 6: IR Sender

Figure 7: IR Receiver

7-Bluetooth Module “HC-05”

Figure 8: HC-05

8-Buzzer

Figure 9: Buzzer

10- LCD 16x2

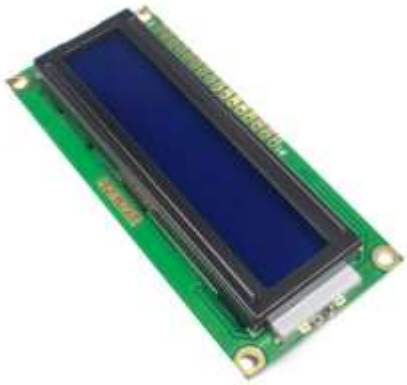


Figure 10: 1602 LCD

11-Jumpers (Male to Male, Male to Female)

Figure 11: MM Jumpers

Figure 12: MF Jumpers

12-Resistors (10k, 220, 1k)

Figure 13: 1K resistor

12-Leds (RGB)

Figure 14: Red LED

Figure 15: Green LED

Figure 16:Blue LED

13-Two Breadboards

Figure 17: Breadboard

14-Potentiometer

Figure 18: Potentiometer

15-Push Buttons

Figure 19: Push Button

Circuit Wiring

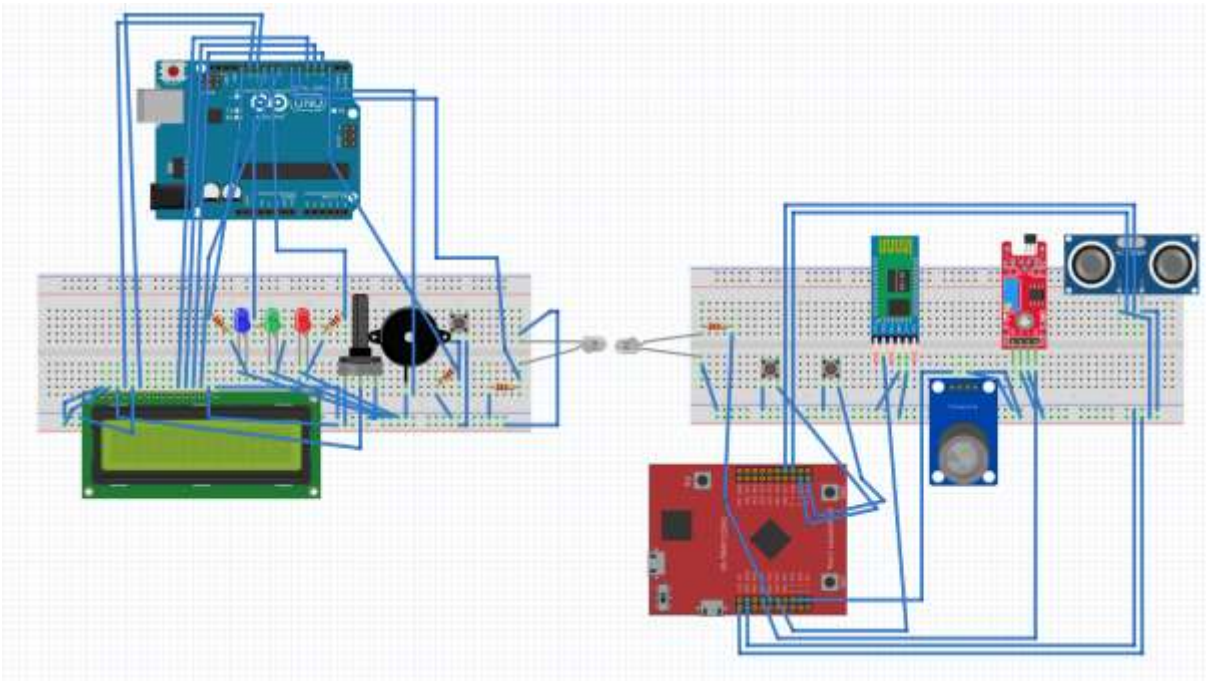


Figure 20: Connection Between Tiva-C, Arduino, and the other components

Discussion Of the Developed Mobile App:

We have used MIT APP inventor to develop the mobile app

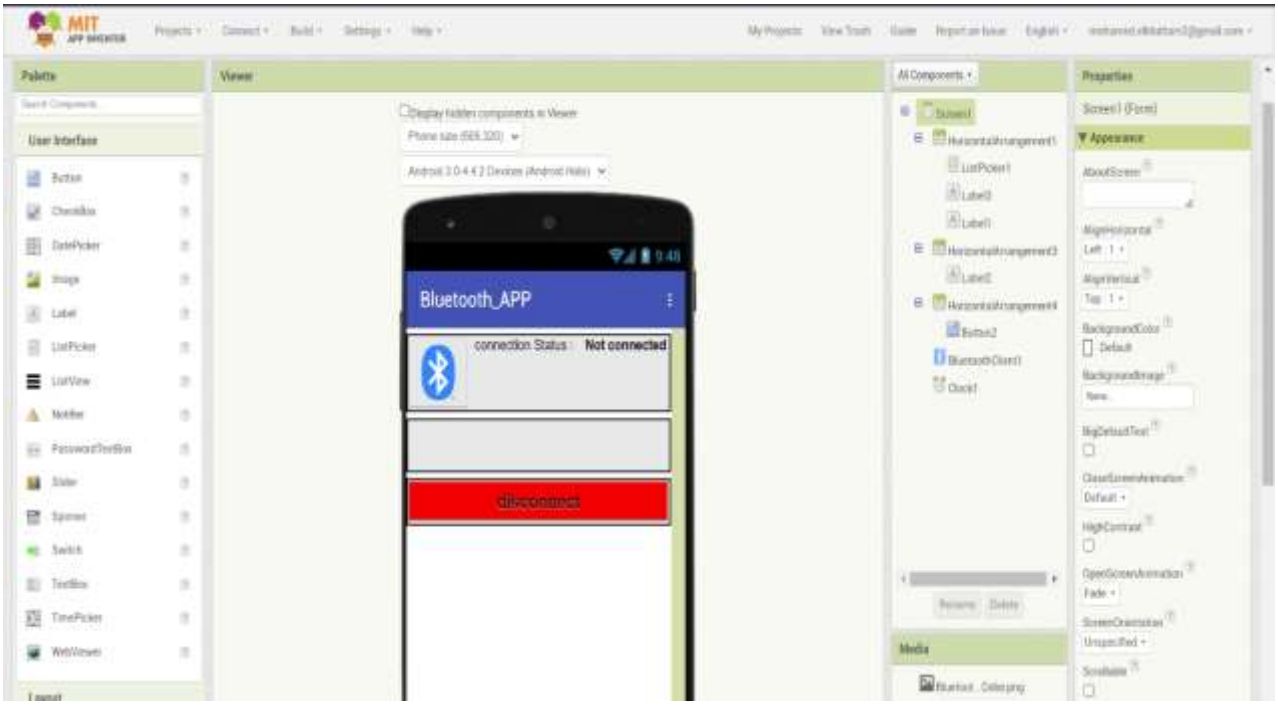


Figure 21View of Designer

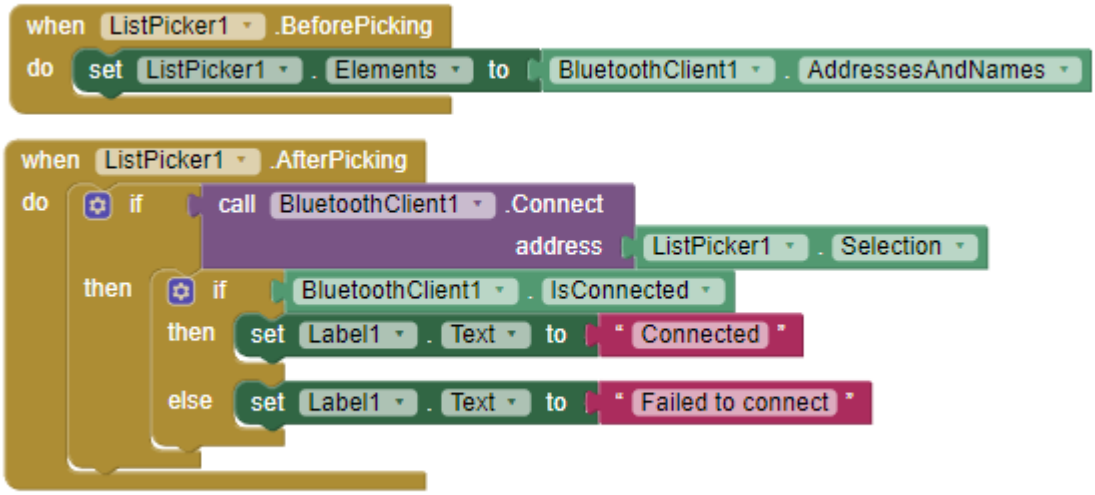


Figure 22Configuring List Picker to view Bluetooth connection

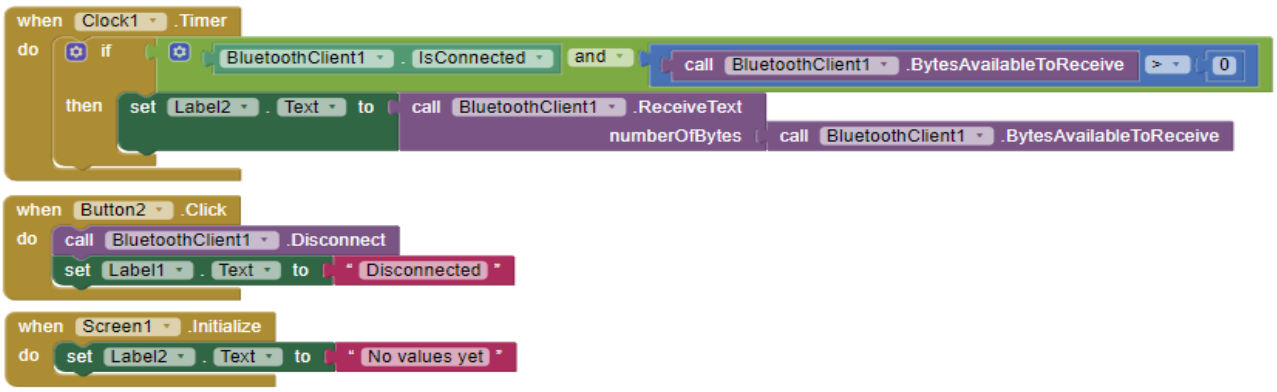


Figure 23 : View of Blocks in APP Inventor

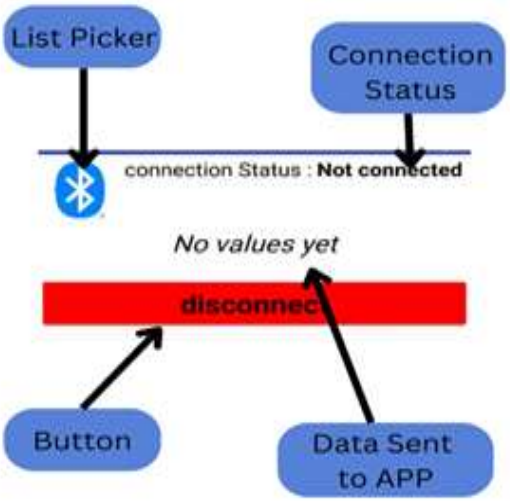


Figure 24: Application Layout

The application contains A List Picker to choose a Bluetooth device, a Label that shows the connection status that will change after connecting to the device to "Connected", and A Label that shows the same sentence that is shown on the LCD that will be changed with each sensor, A disconnect button.

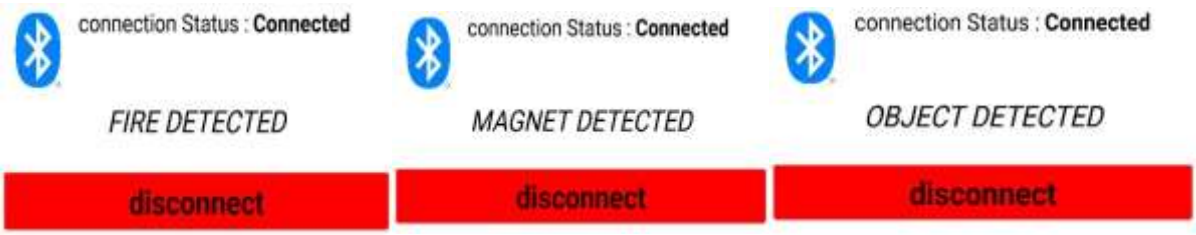


Figure 25 Different Sentences received