

Internet of Things 2ECDE65

"M2M Communication"

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Introduction

A form of data transmission which involves one or more entities but does not necessary involve any human involvement or intervention known as machine-to-machine (M2M) communication. M2M is also known as Machine Type Communication (MTC). It varies from current communication models in that it could potentially involve a very large number of communicating terminals, different or new market scenarios, lower costs and effort, and little traffic per terminal.

n general, M2M communication could be carried over mobile networks like CDMA, GSM-GPRS, and EVDO networks. Mobile networks' primary function in M2M communication is that of a transport network. M2M presents both exceptional prospects and distinct challenges.

Objectives

- Establishing wireless communication between two machines (nodes) via TCP/IP protocol without using Internet.
- The goal is to transfer data from one machine to another machine, and for this, we have used buttons as input on one side and LEDs as output on the other side.
- In case of failure of internet establishing supplemental communication between machines.

Literature review

- The NodeMCU ESP8266 connected to a DHT 11 temperature sensor is represented by Machine A (Client) in the system overview, which features two machines. The client node's job is to read the ambient temperature, determine whether the reading has exceeded the threshold, and, if so, connect with the server.
- The NodeMCU ESP8266 is also represented by Machine B (Server), and it is linked to a DC relay as depicted. Receiving notifications from the client and choosing whether to turn on or off the actuator are the duties of the server node. TCP/IP is a connection establishment protocol across client and server and is kept active until the application data at each end has finished exchanging. The connection is wireless.

Block Diagram

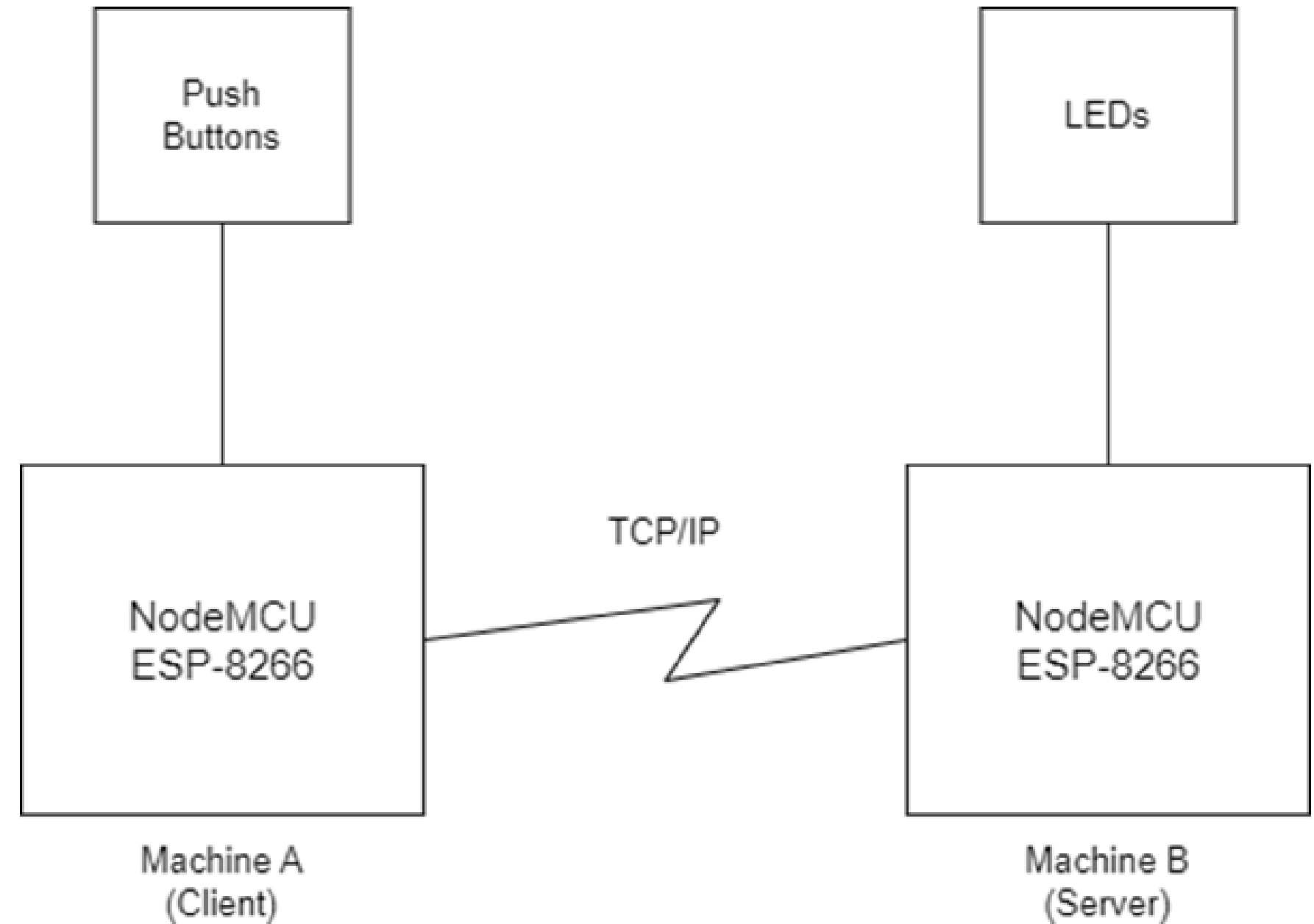


Fig 1. Block Diagram

Components Required

- NodeMCU
- LED
- Resistor
- Push Button
- Breadboard

Schematic of Hardware

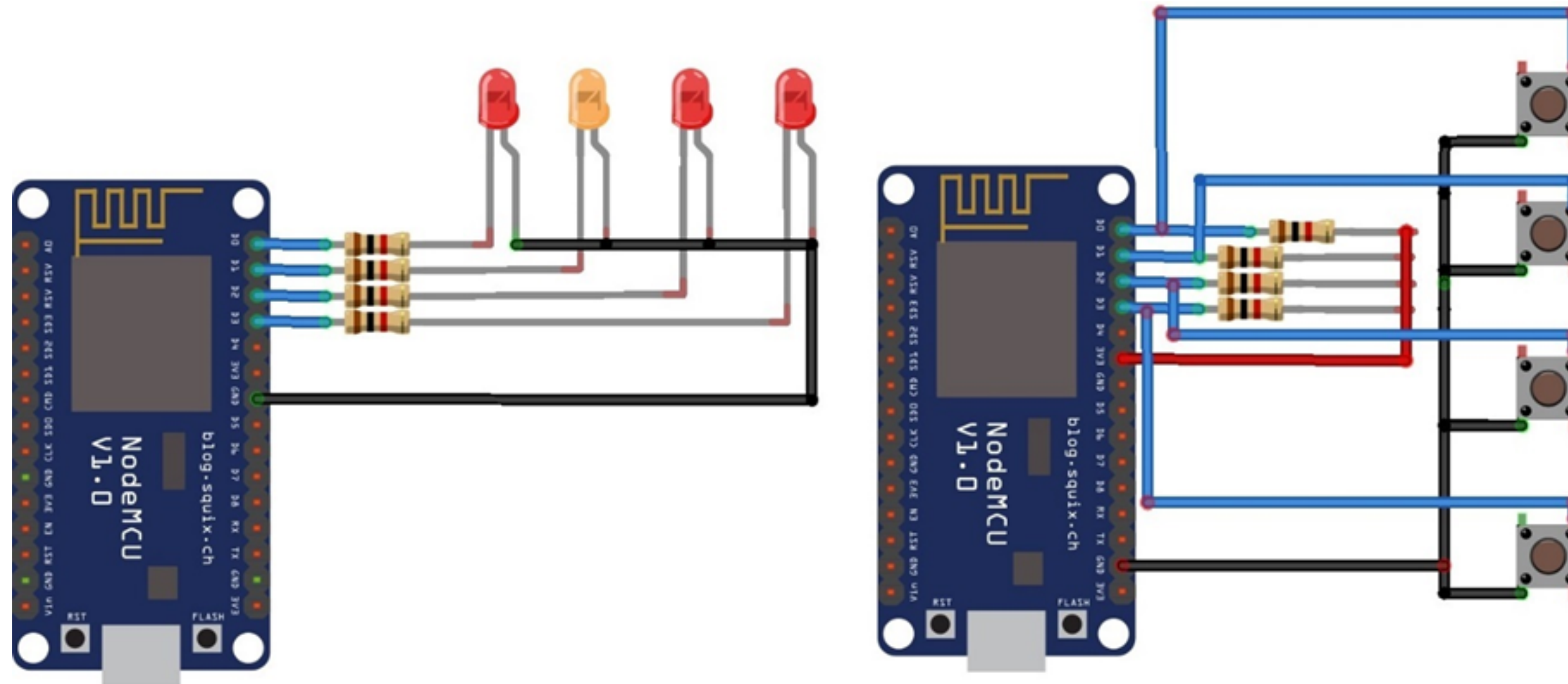


Fig 2. Schematic of Hardware

Working

- The NodeMCU ESP8266 is represented as Machine A (Client) in system overview, which is made up of two machines. The client node's job is to recognize when a push button is pressed, process the information, and send the information to the server.
- The NodeMCU ESP8266 is also represented by Machine B (Server), which is linked to a string of LEDs. Receiving notifications from the client and choosing whether to turn on or off the LED are the duties of the server node.
- TCP/IP (Transfer Control Protocol/Internet Protocol) is a session establishment protocol between client and server and is kept active until the application data at each end has finished exchanging. The connection is wireless.

Hardware Implementation

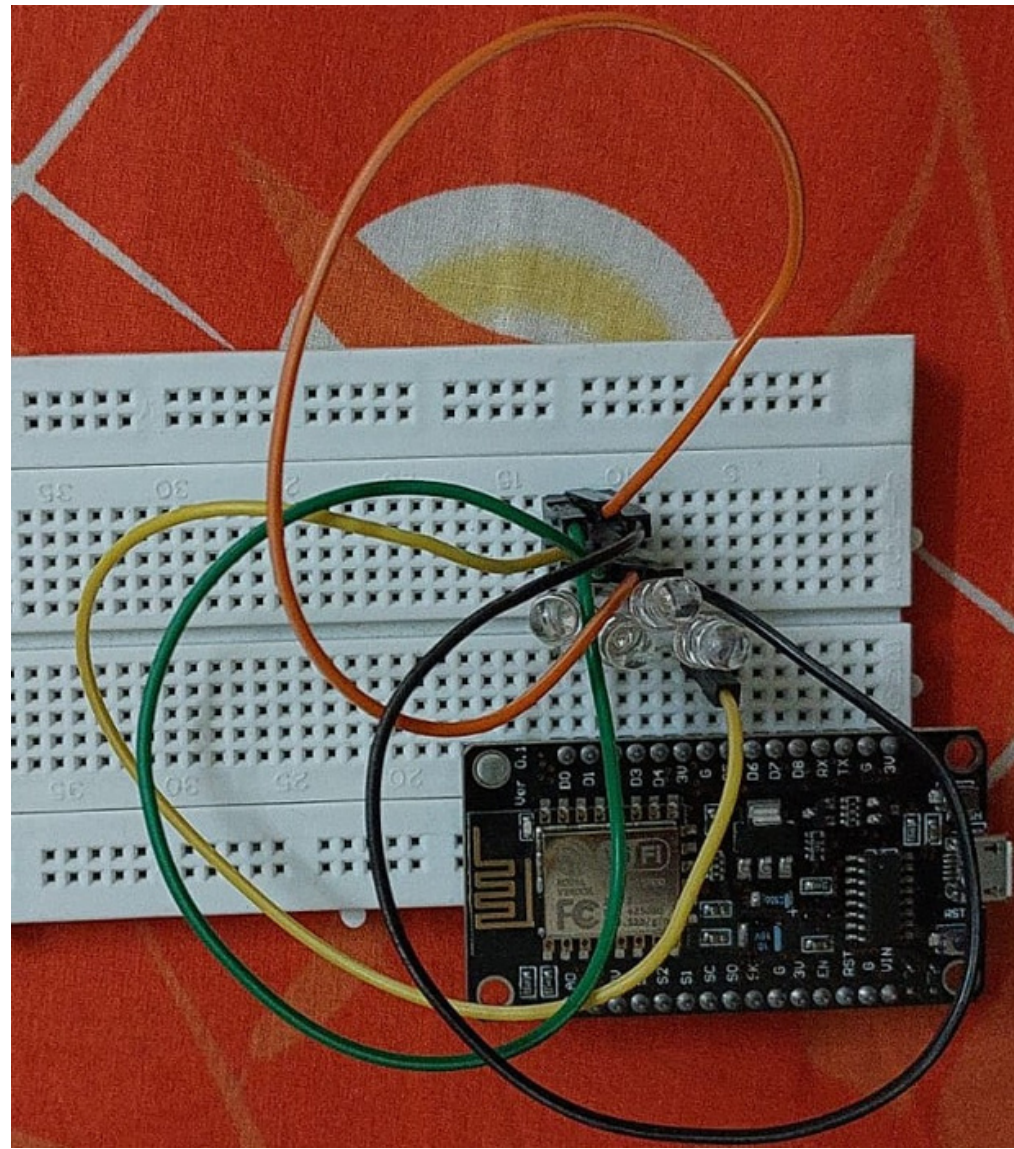


Fig 3. server-sideImplementation

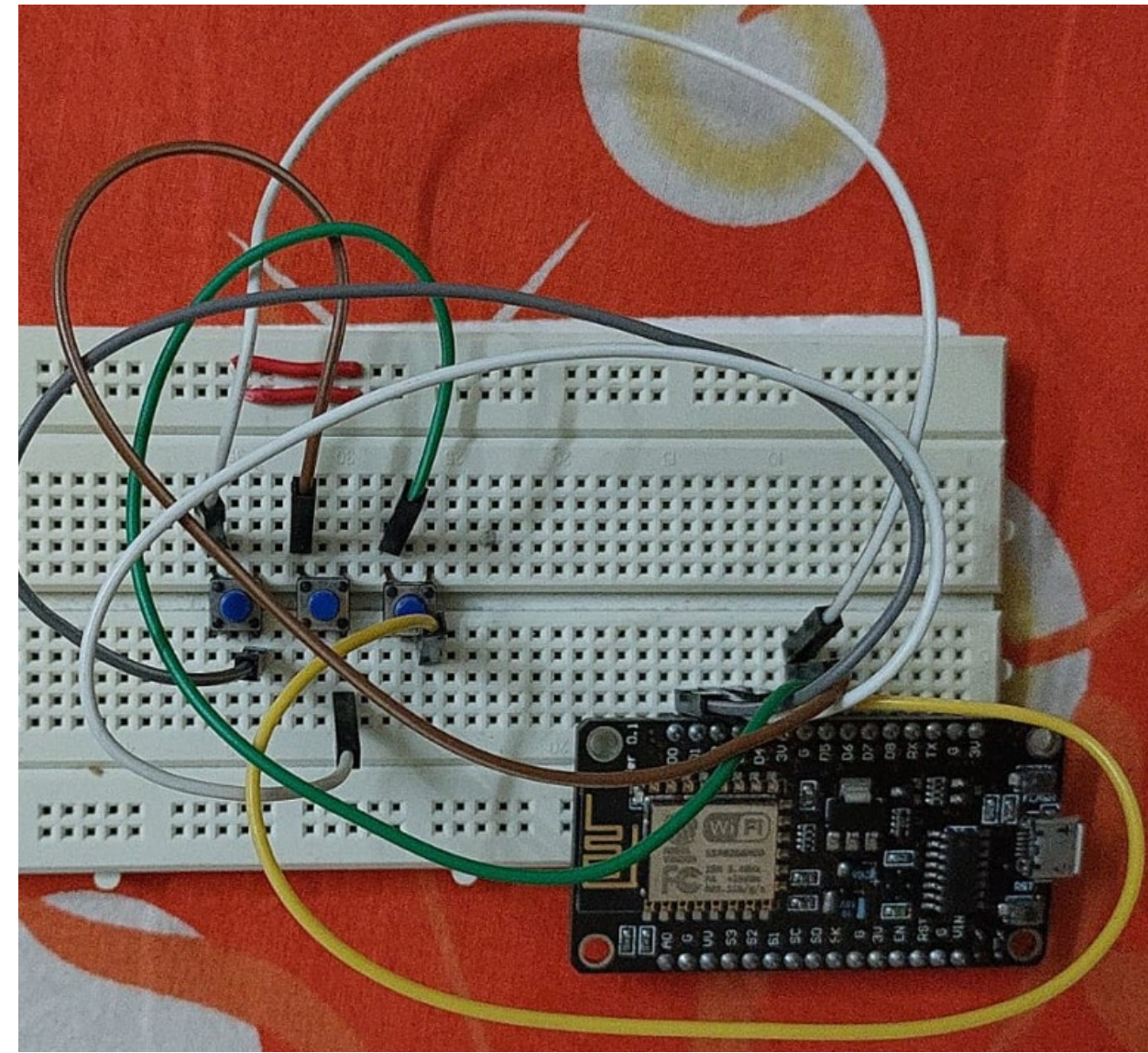


Fig 4. client-sideImplementation

Conclusion

Creating and implementing a low-cost M2M communication system based on two ESP8266 NodeMCU boards was the aim of this endeavor. One node will serve as a Station (Client), which is coupled to a push button that serves as a switch, and the other node will serve as an Access Point (Server). The client should contact the server whenever the push button is pushed. The server will either turn on or off the LED depending on the circumstance. The system showed a maximum communicating distance of 10 meters during distance analysis; at this distance, the Station loses connection with the Access Point. Also, we can add some sensors at the client side and which will sense the data and the processes the data and if found useful it can send it to server and on basis of the data it can turn on or off some actuators.

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Thank You