Group Coursework Presentation Slide
CC5068NI - Cloud Computing and the Internet of Things

Smart Garage Door System

Section:L2C2

Team: 6

London Met ID	Student Name
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1. Introduction

- From early computers to smart gadgets today, **technology is evolving at increasing complexity**.

- One of such fascinating technology is **Internet of Things (IoT)**.

- IoT refers to the **interconnection of physical devices** like sensors and other objects **for exchanging data over the internet** (S.Gillis, 2023).

- Its versatility allows to **create creative solutions, automate operations and increase efficiency** of the tasks.

- Common focus area for **our project** lie within Home Automation, thus, was **Smart Garage Door System**.

1.1 Background and Motivation

- Operating garage doors **manually is inefficient, unsafe and insecure**
- Requires physically **getting in and out** of car multiple times
- Can **lead to accidental injuries** and door damage
- **Easy access point for break-ins** without security features
- Smart garage door systems **provide remote access, automation and enhanced security**
- **Control doors** from smartphones **anytime, anywhere**
- Just **click to open/close** the door
- Inbuilt **safety mechanisms like object detection**
- **Real-time** status **updates** and **alerts**

1.2 Problem Statement

- Existing garage doors involve repetitive manual handling when parking cars, causing major inconvenience

- No options for remote access or monitoring garage door status

- Outdated security makes garage a vulnerable access point for intruders

- Lack of sensors increases risk of injuries due to accidental closure

1.3 Solution and Project Overview

- Proposed solution is an IoT based **Smart Garage Door system**

- Allows users to conveniently **open and close garage door via smartphone**

- Incorporates **security features like restricted access**

- Object detection **prevents accidental injuries**

- **Easy monitoring** through status updates on dedicated web app

- **Utilizes** NodeMCU, IR sensor, servo motor and other **IoT components**

2. System Demonstration

2.1 Overview of the System

- Remote access

- Automated

- Convenient

- Secure

- Smart monitoring

- Mobile control

- Automatic safety
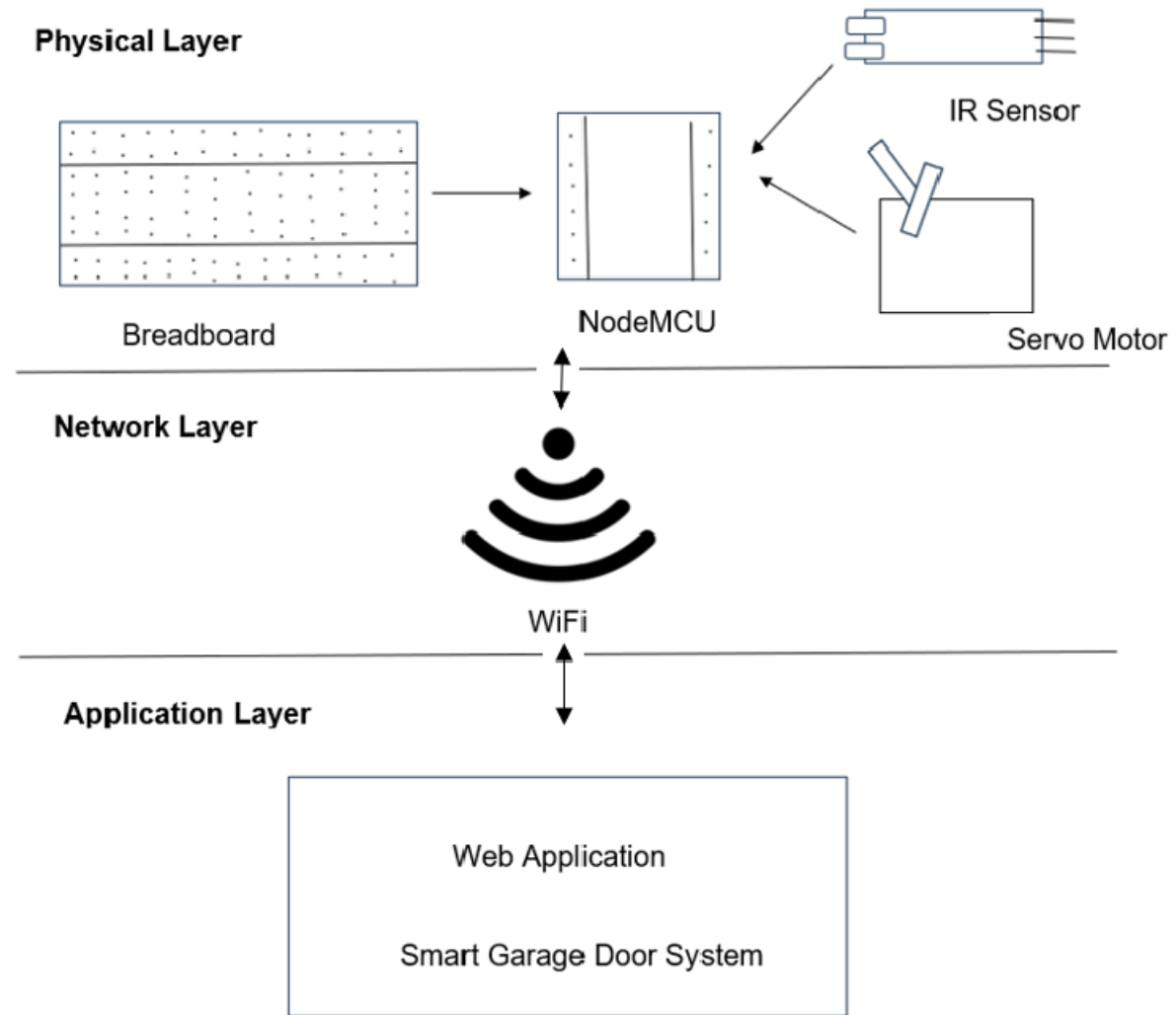
Figure: Block Diagram of Smart Garage Door System
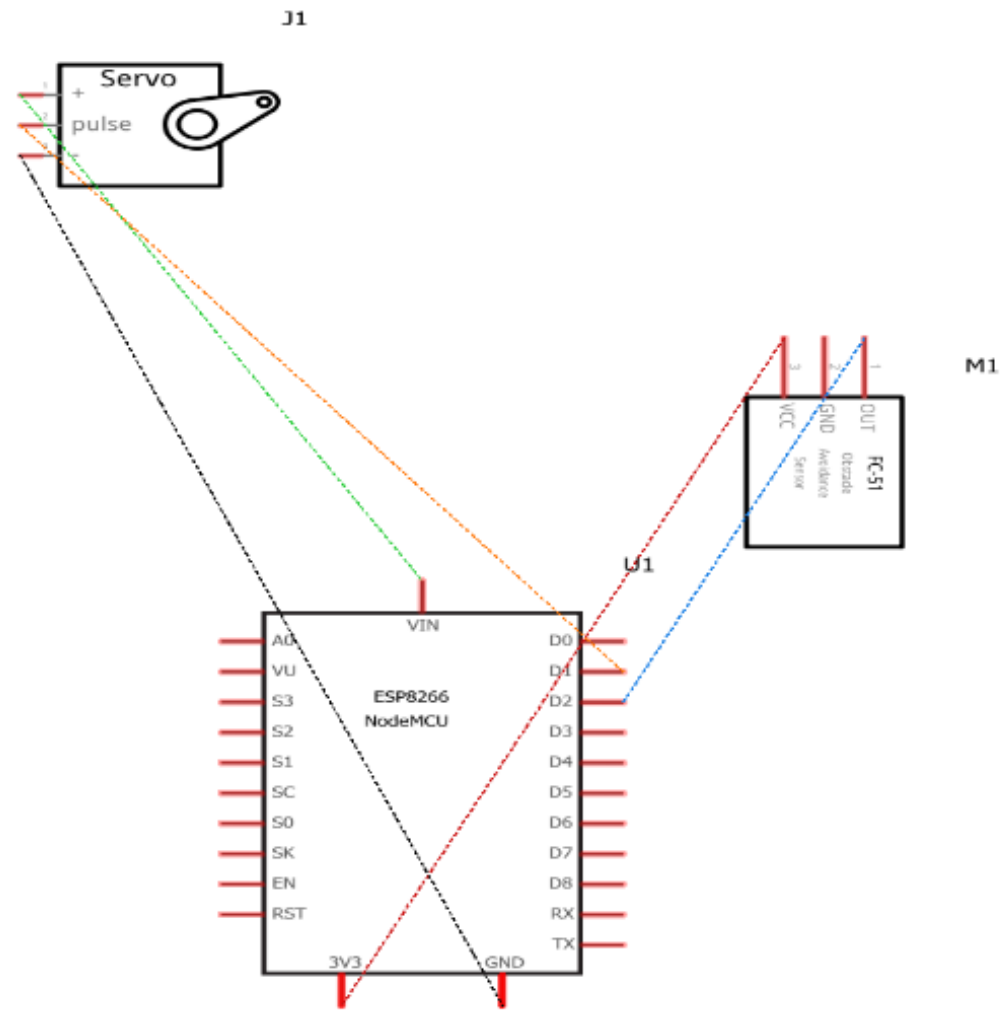
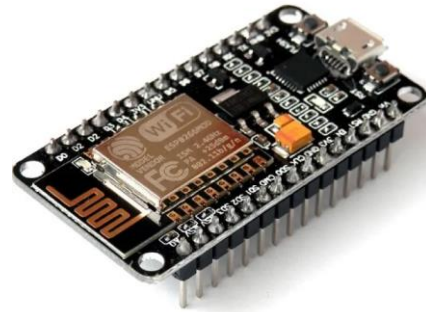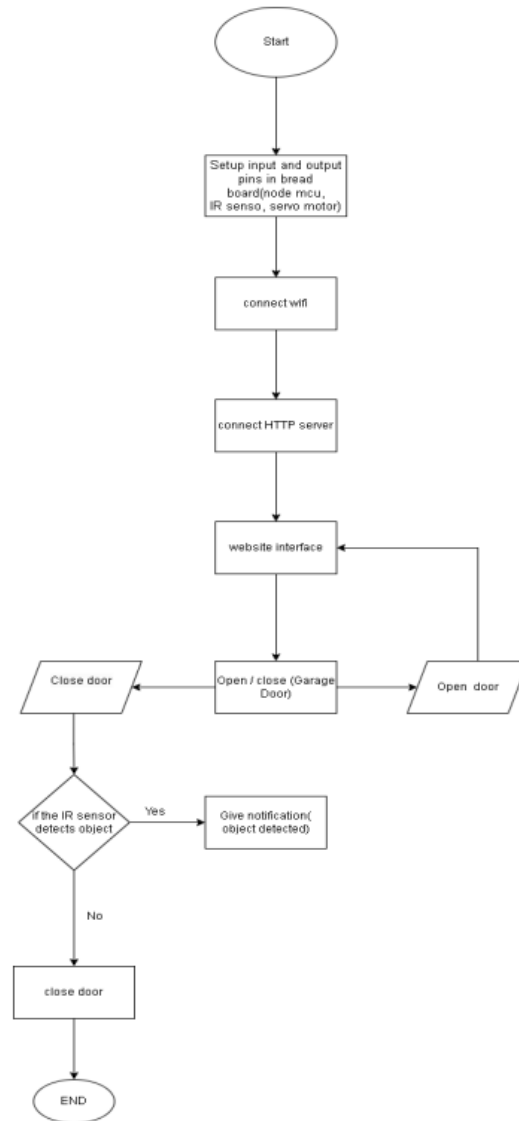Figure: Schematic Diagram of the System

2.2 Hardware Components

o **NodeMCU ESP8266** - WiFi enabled microcontroller

o **IR sensor** - Detects objects obstructing door

o **Servo motor** - Opens and closes garage door

o **Jumper wires** - Makes connections between components

o **Breadboard** - Houses and connects components

2.2 Hardware Components
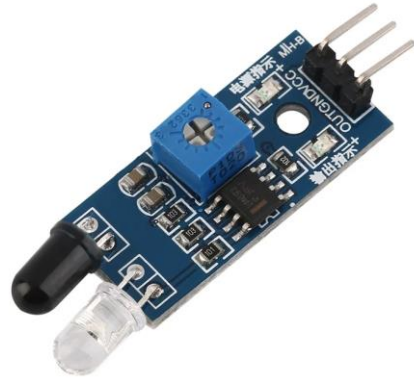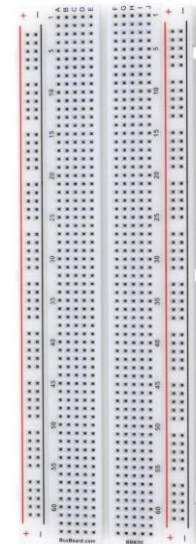
IR Sensor   Node MCU   Servo Motor   Breadboard

2.3 Software Components

- Arduino IDE - For coding and uploading programs
- Fritzing - Creating circuit diagrams
- Draw.io - Making system diagrams like flowchart
- MS Word - Documentation and reporting

2.4 Development Process

- Planning and design

- Acquiring components

- Connecting components on breadboard

- Coding for NodeMCU in Arduino IDE

- Testing each function through iterations

- Troubleshooting issues

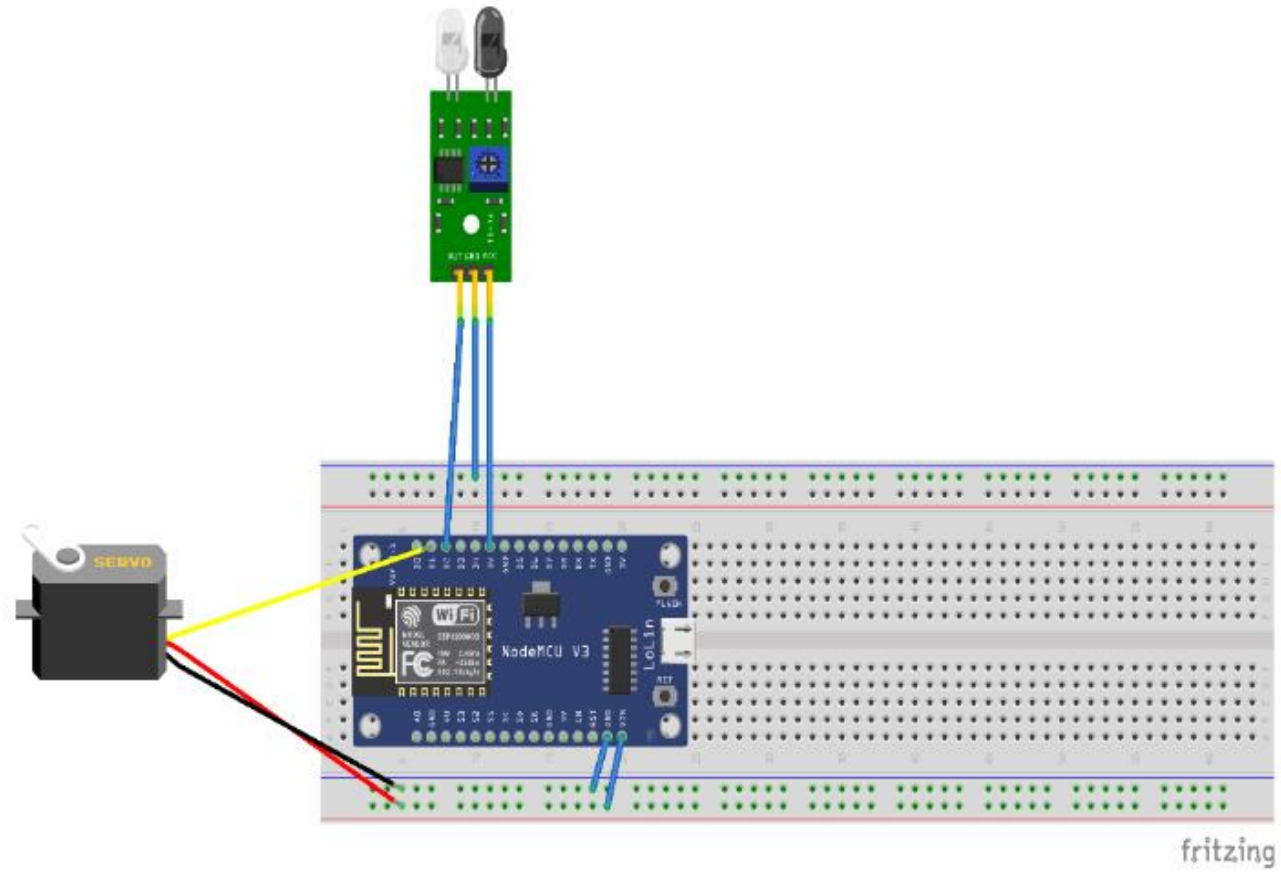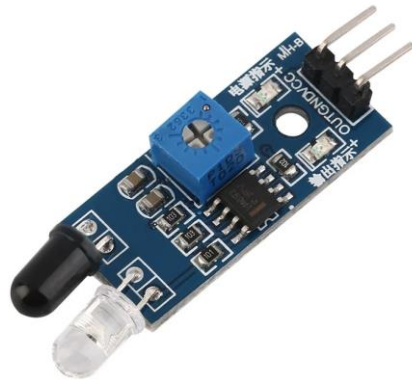- Beautification of prototype

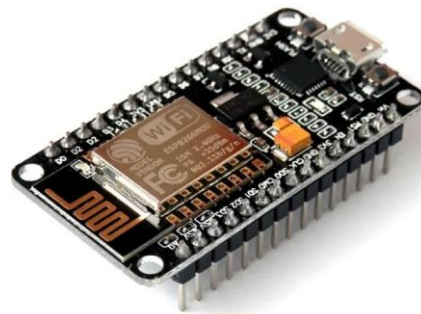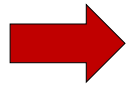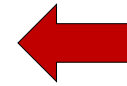Figure: Flowchart Diagram of the System

Figure: Circuit Diagram of the System

IR Sensor **Node MCU** **Servo Motor**

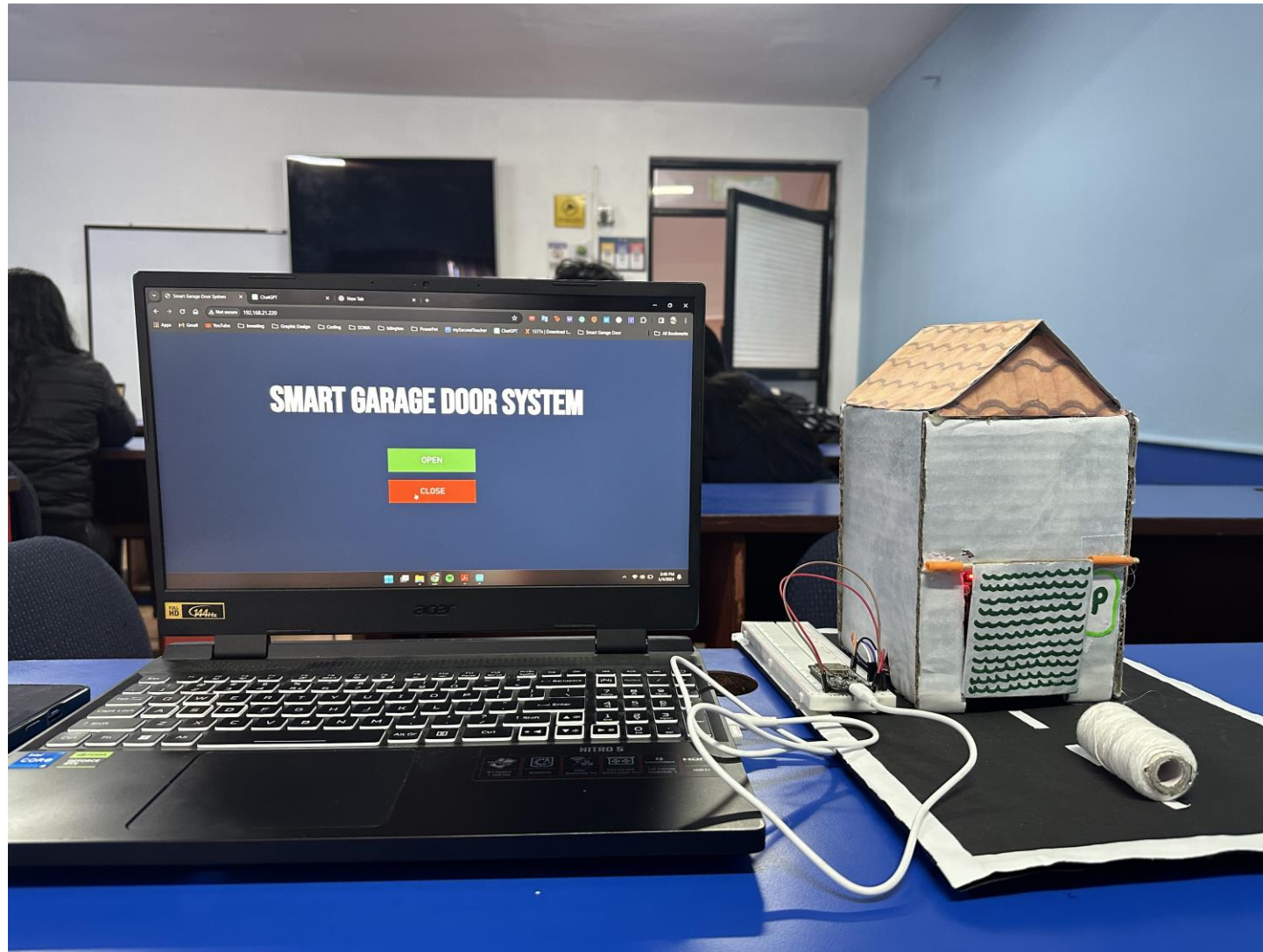Figure: System Hardware Communication Mechanism

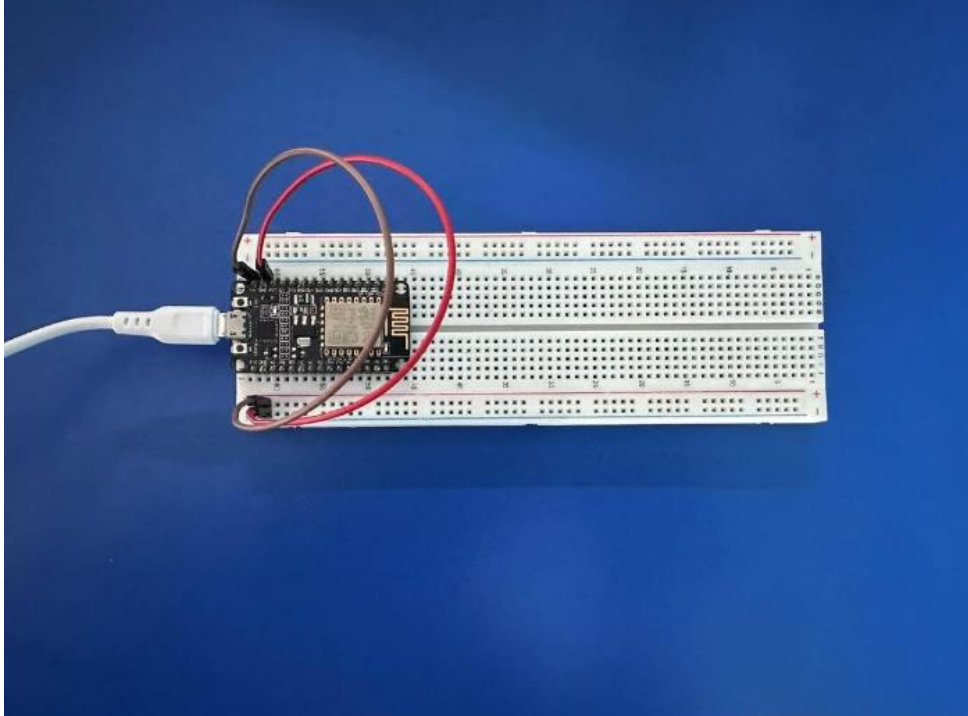Figure: Integration of the complete system

Figure: Connecting
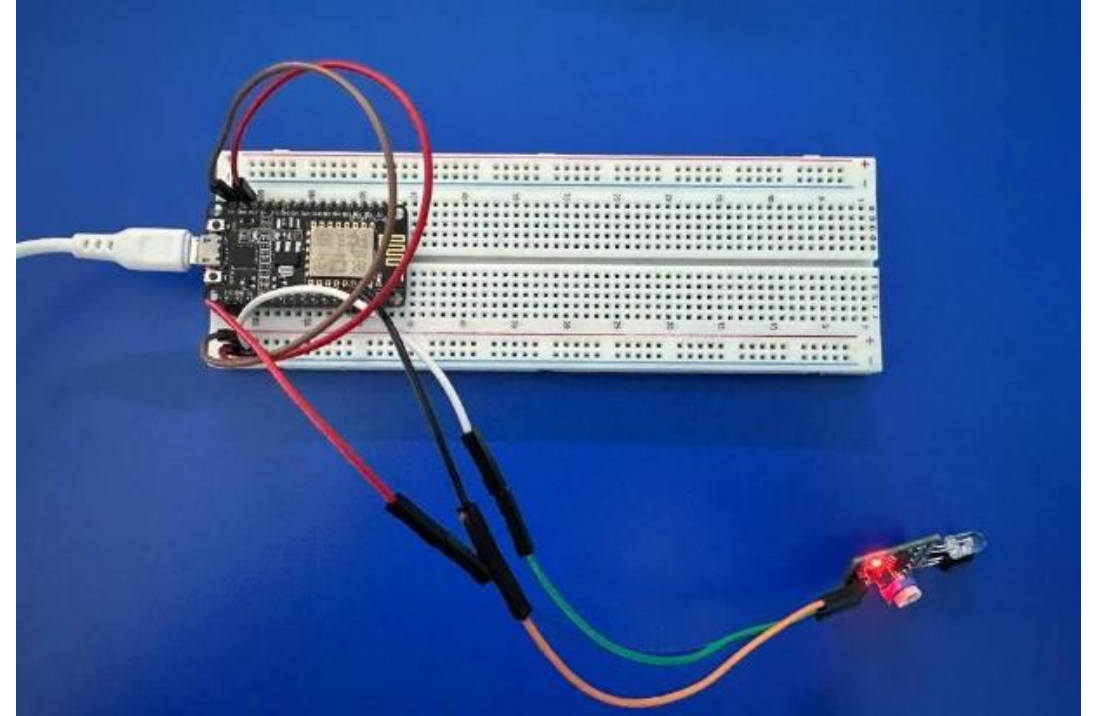NodeMCU on Breadboard

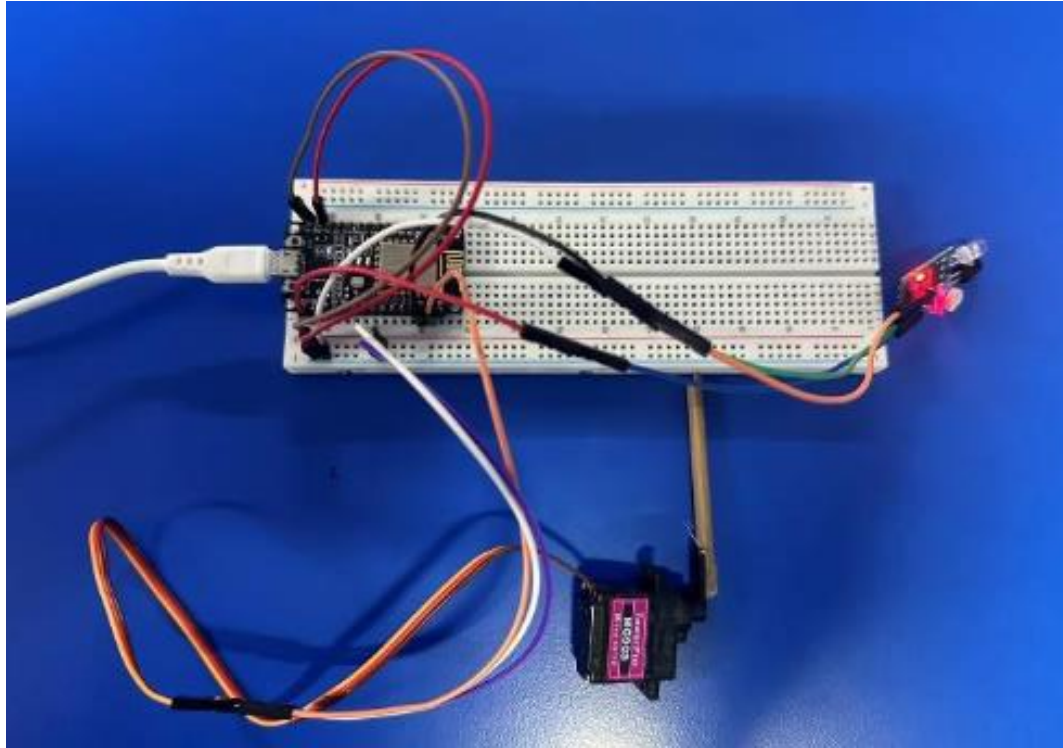Figure: Connecting IR Sensor
on Breadbord

Figure: Connecting Servo
Motor on Breadboard

Figure: Beautified Smart
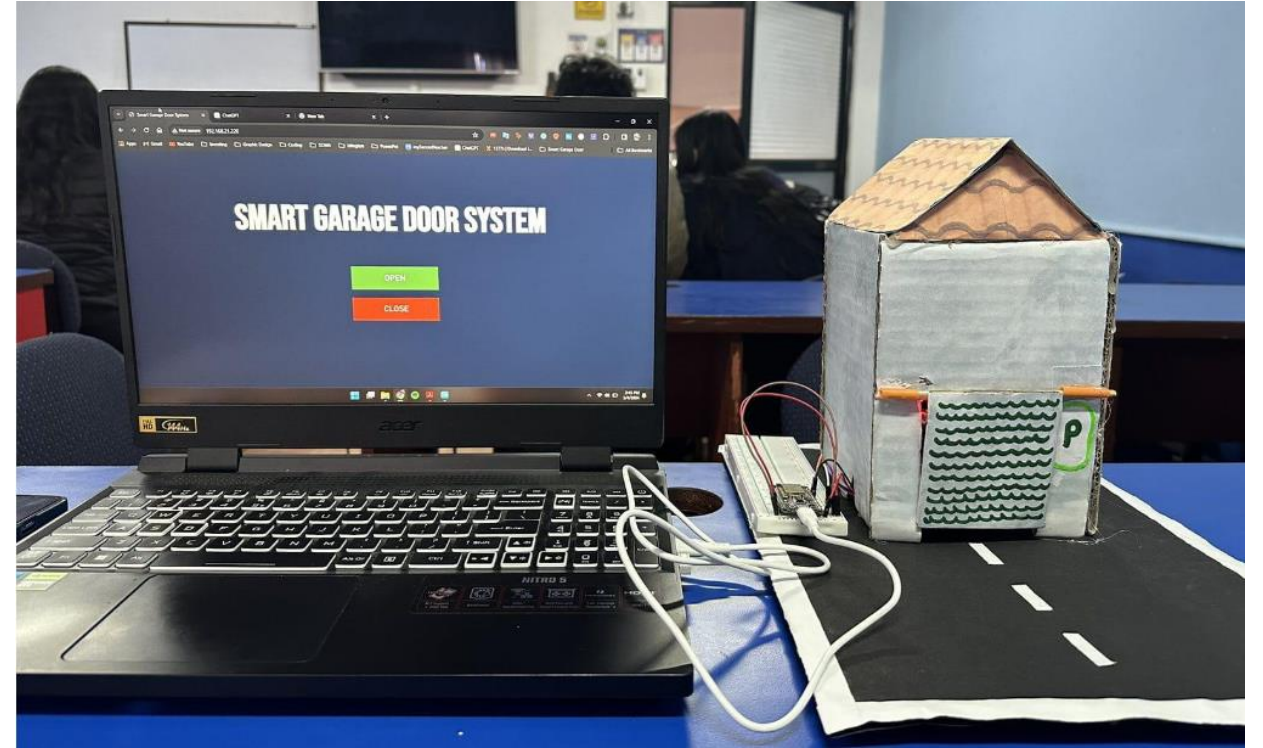Garage Door System

Figure: snippet of code
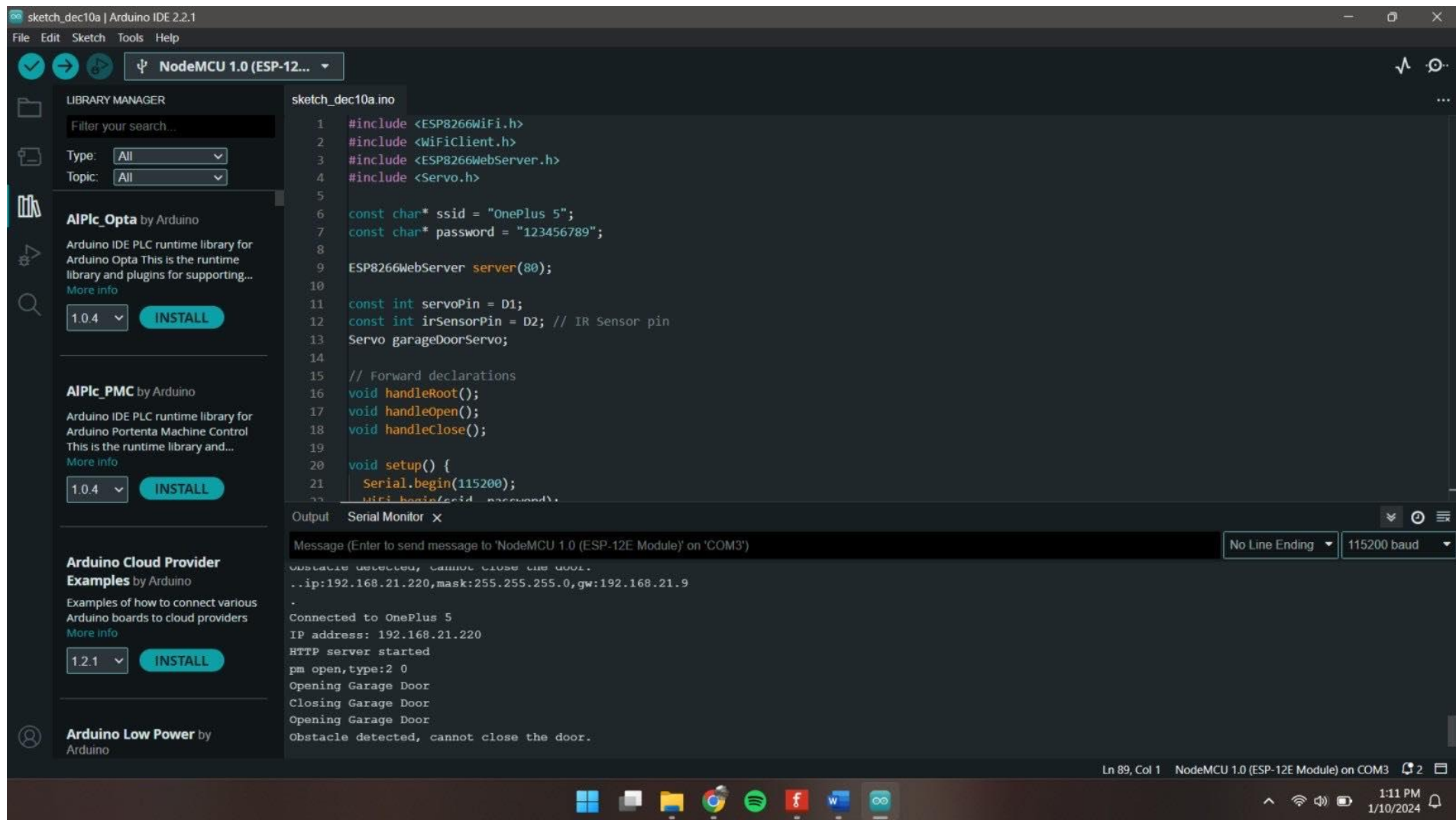
Figure: snippet of code

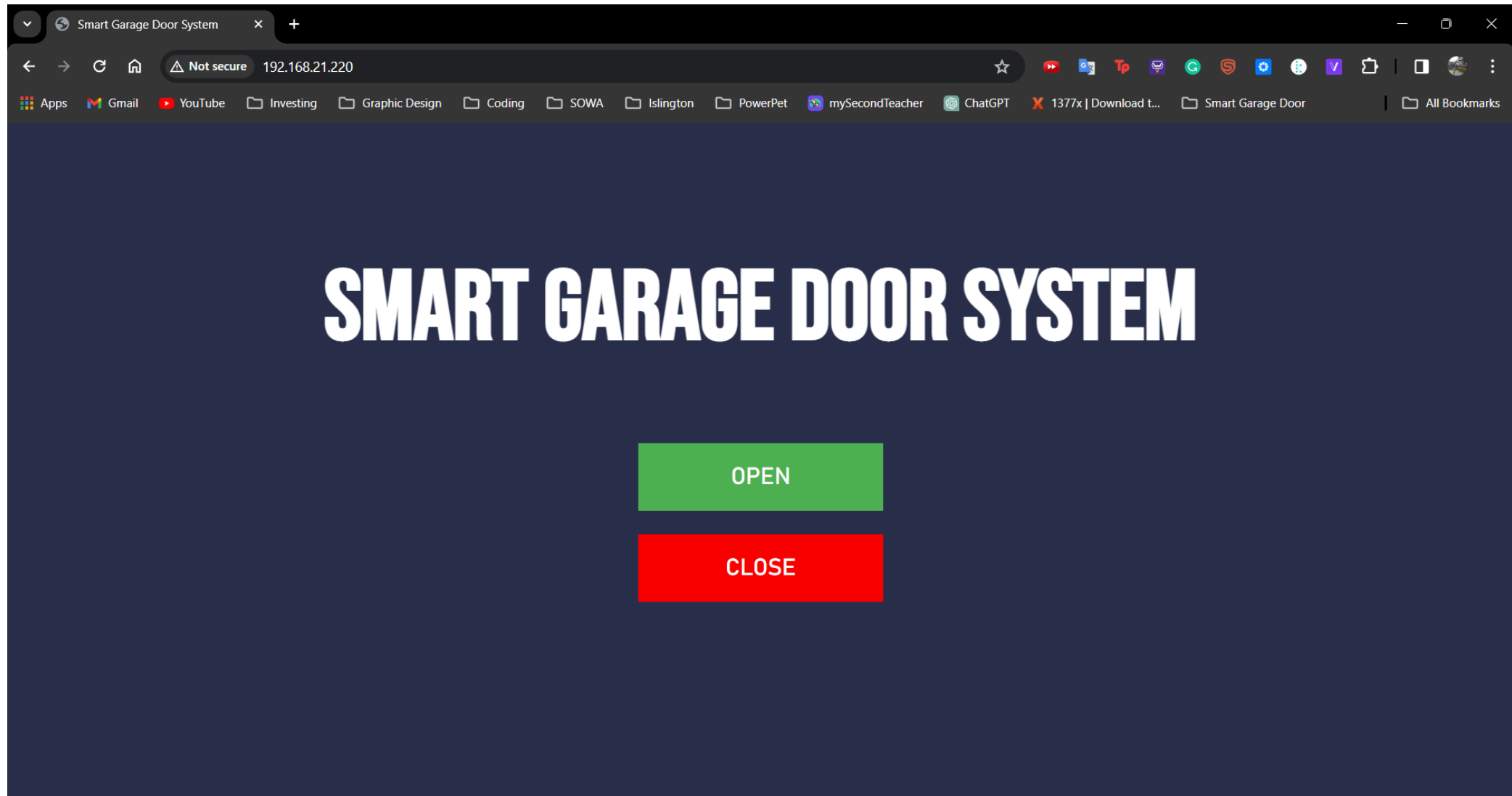Figure: Web Interface of the System
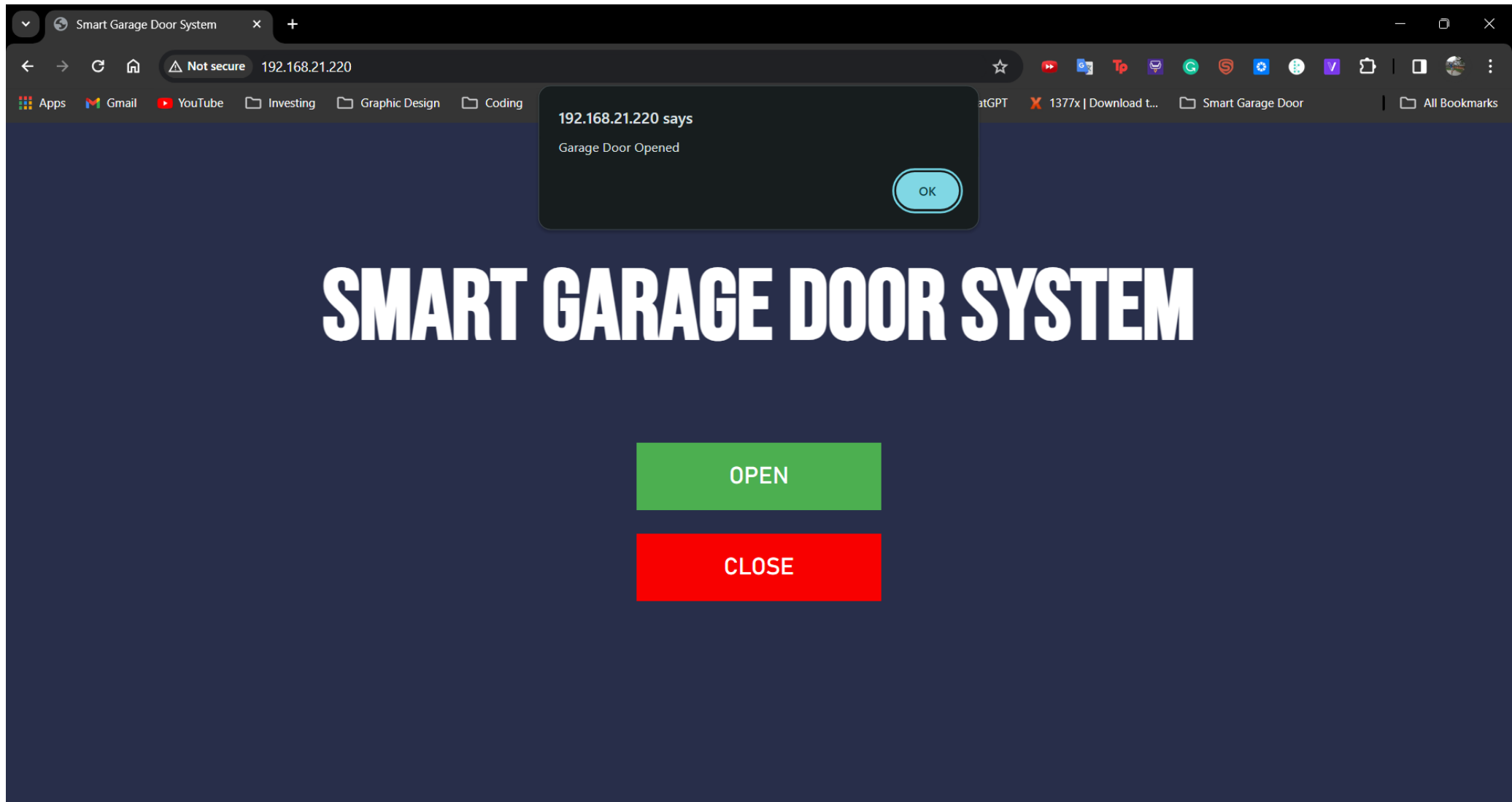
Figure: System says "Door Opened"
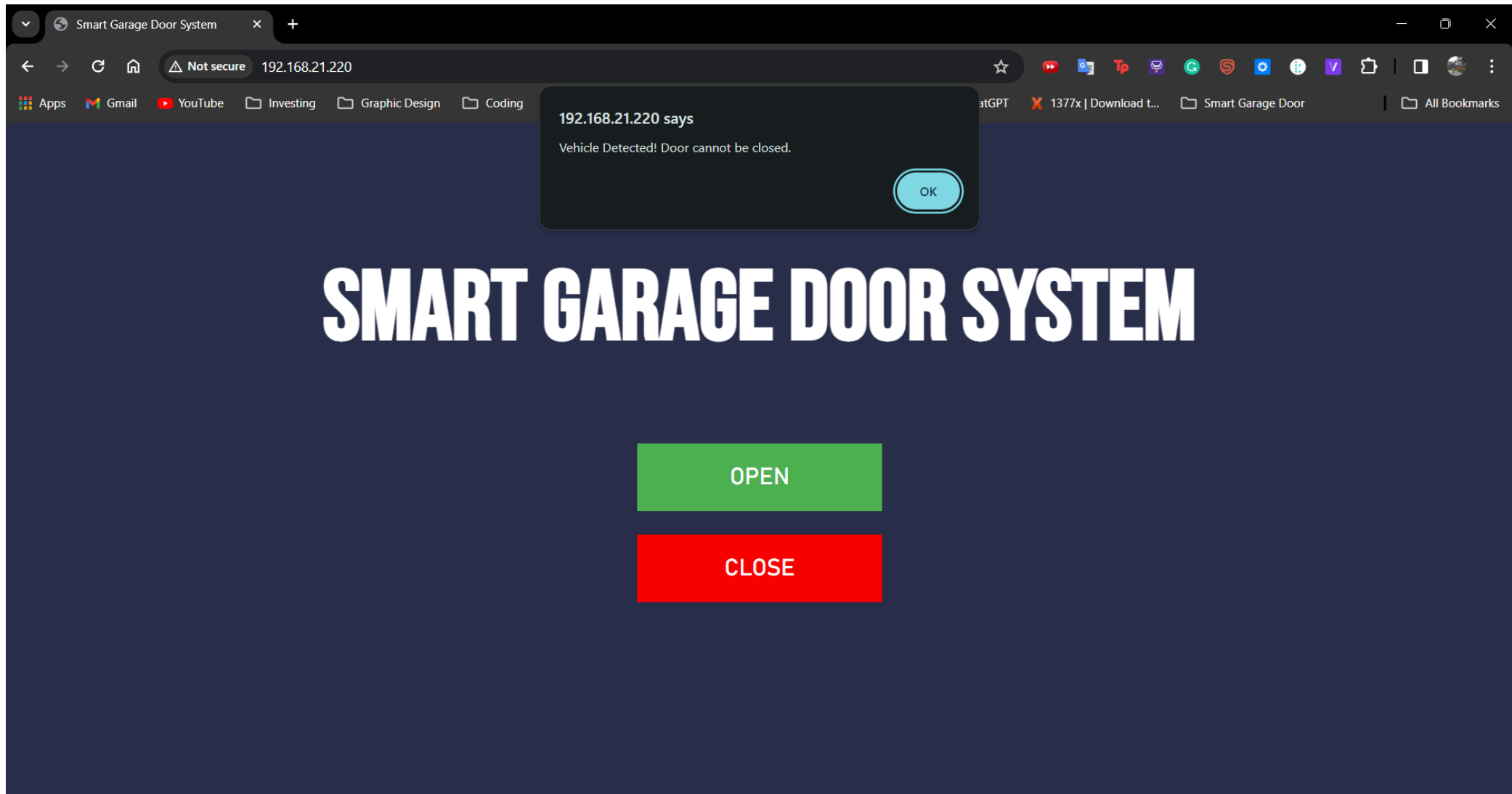
Figure: System says, "Vehicle Detected! Door cannot be closed."

Video: Video of the Demo

2.5 Results

- Successfully **built functional prototype** meeting objectives

- Allowed **remote access through web app** on smartphone

- **Detected objects** and prevented accidental closure

- **Enhanced** convenience, automation and security

2.5 Test Cases

o IR sensor object detection

o Remote opening and closing of door

o Integrating code with physical components

o Alert generation on obstacle detection

o Checking servo motor functionality

3. Individual Contribution (WBS)

Smart Garage Door System

Team Member	Roles	Contribution
Dikshya Sharma	**Report Preparation**: Being the leader, prepared the Introduction, compiled the Results & Findings including Testing also mentioned the Future Works, and created the Block Diagram. **Presentation**: Objectives, Result and Findings and Future Work. **Implementation**: Connecting Physical components to the prototype and performing final testing.	25%

3. Individual Contribution (WBS)

Smart Garage Door System

Team Member	Roles	Contribution
Anushka Bhandari	**Report Preparation**: Prepared the System Architecture, worked with the Acknowledgment, Abstract and Conclusion and helped with the Individual Contribution Plan **Presentation**: Software Requirement Analysis, Overview of the System and Conclusion. **Implementation**: Beautifying the System.	25%

3. Individual Contribution (WBS)

Smart Garage Door System

Team Member	Roles	Contribution
Shuvam Rajbhandari	**Report Preparation**: Prepared the Requirement Analysis, created various Diagrams including the Circuit Diagram, also contributed to the development of the project and provided an Overview of the project. **Presentation**: Introduction and Development of a system. **Implementation**: Setting up Arduino IDE and writing code for proper functioning of the system.	25%

3. Individual Contribution (WBS)

Smart Garage Door System

Team Member	Roles	Contribution
Ikshit Maharjan	**Report Preparation**: Prepared the Flowchart, contributed to the Development processes, and also worked with the Schematic Diagram and Software components. **Presentation**: Hardware Requirements and Planning and Design. **Implementation**: Connecting Physical Components and looking after the components and tracking it's working.	25%

Thank You