

SM Mini Group Project Group Number 15

Smart Door System with Mask Detection

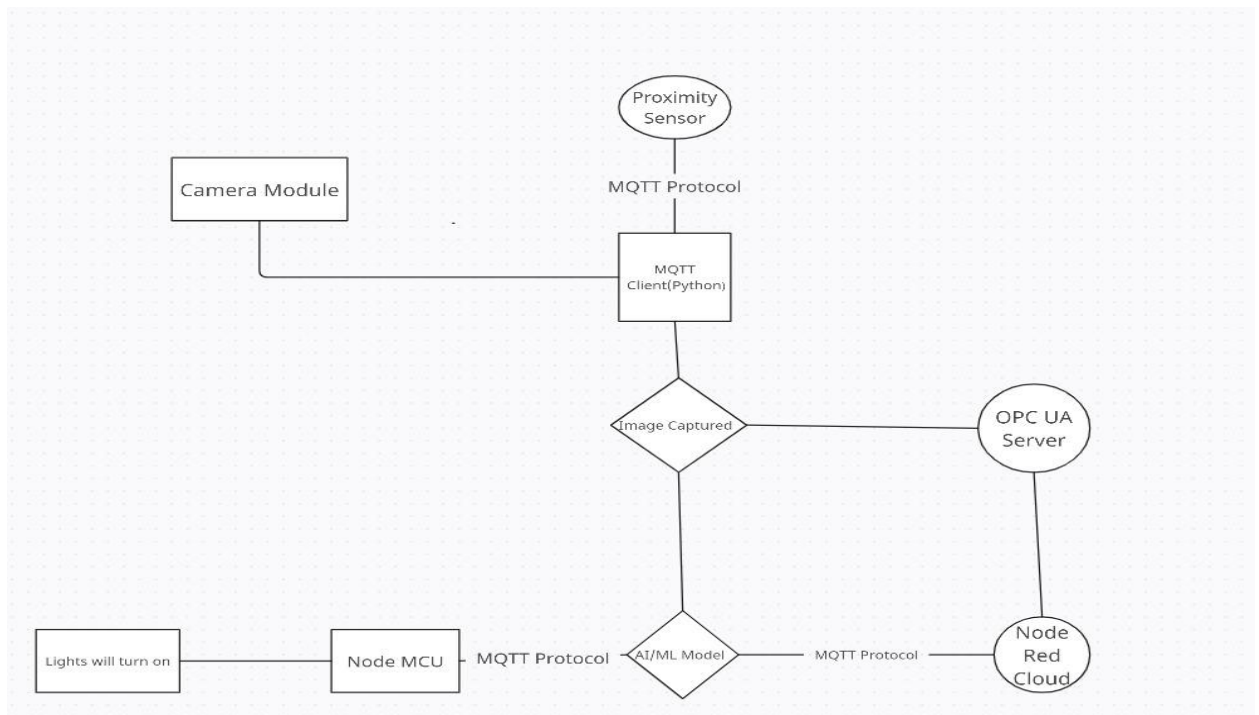
Group Members

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Block Diagram

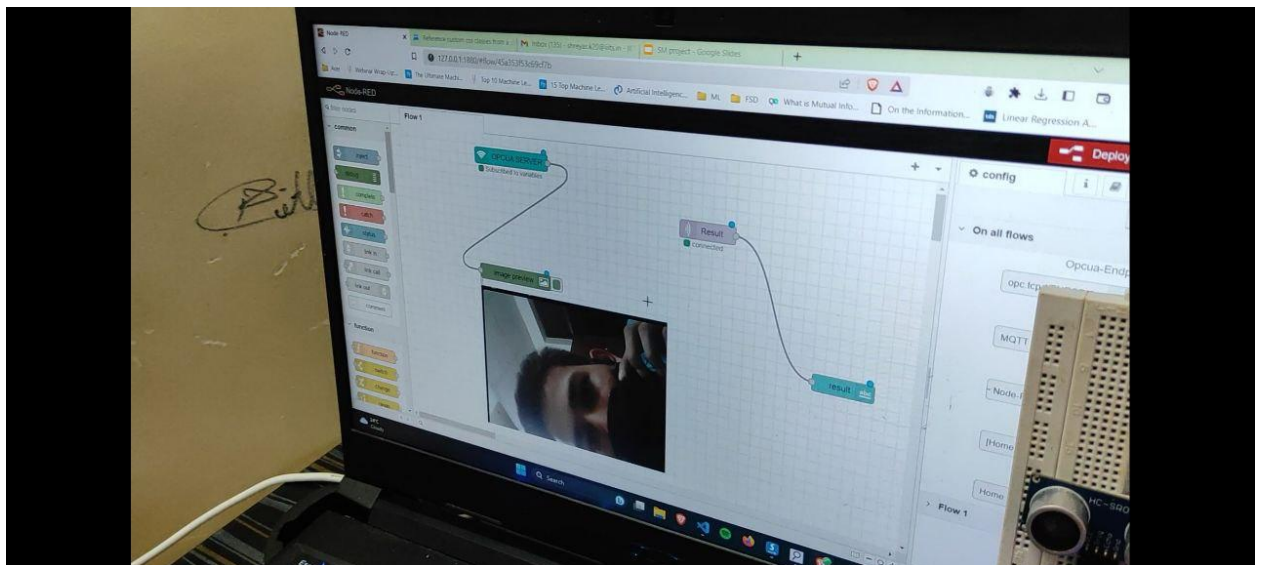


Hardware and software modules used

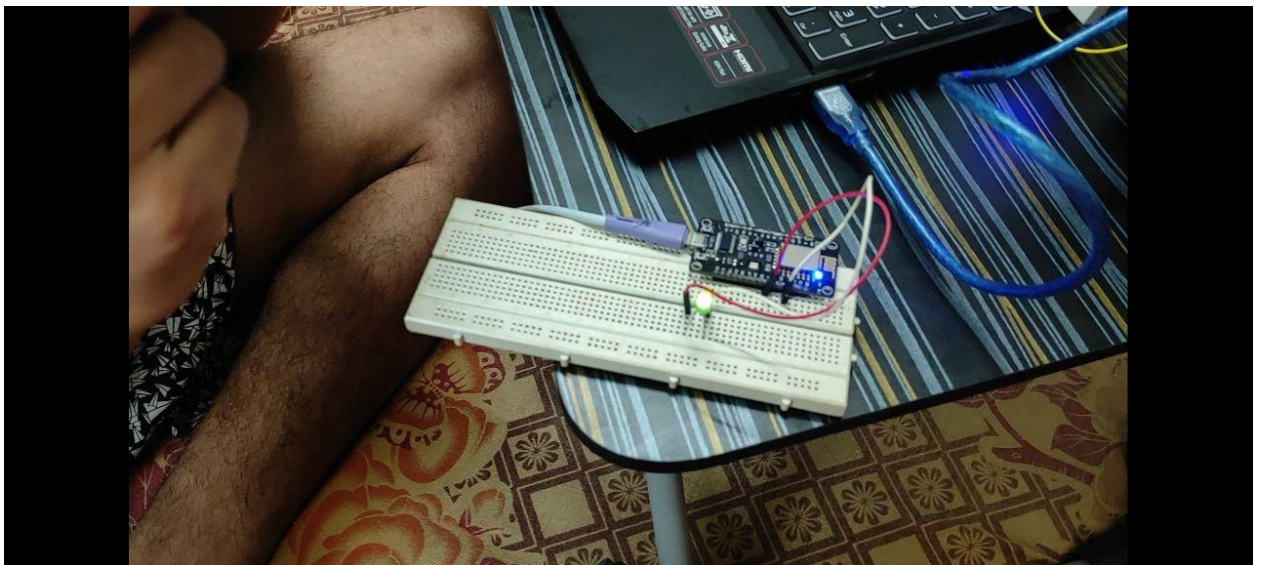
- Arduino Board
- Ultrasonic Sensor
- ESP 32 Camera Module
- Node MCU
- LED Bulbs

- Python
- Node Red Cloud
- Matlab

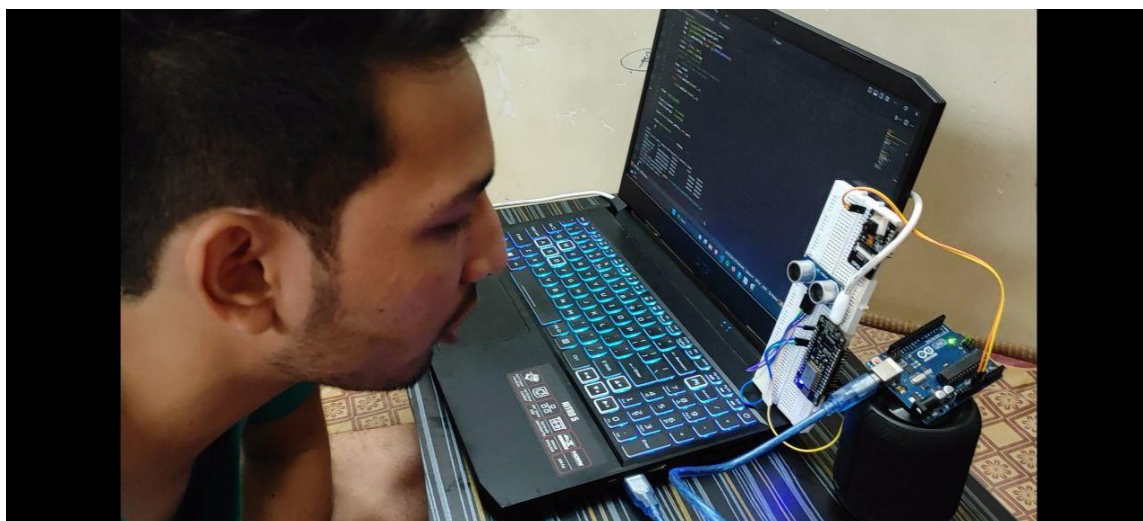
Results



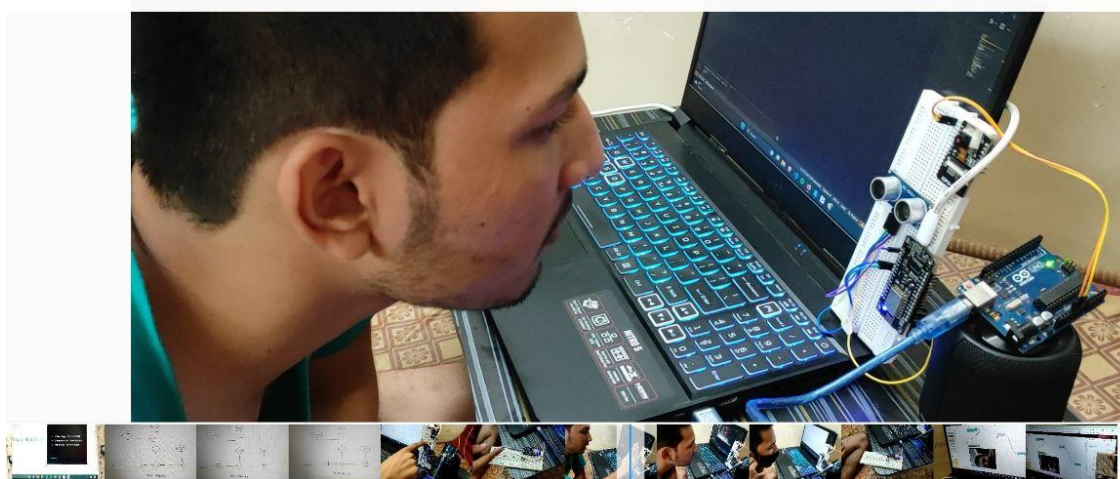
This is the output of the Node MCU, where we can see the image of the person with or without the mask. This displays the last image captured and the output of 1 and 0 to light the LED Bulb or not.

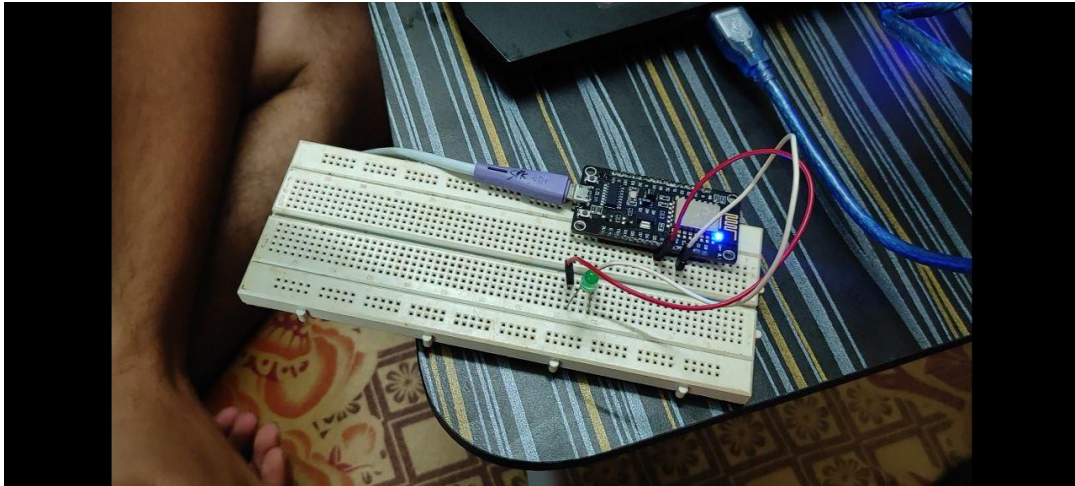


In this scenario, we see that the person has the mask on, and this info is sent to the AI/ML Model too, which determines the output of switching on the light bulb.

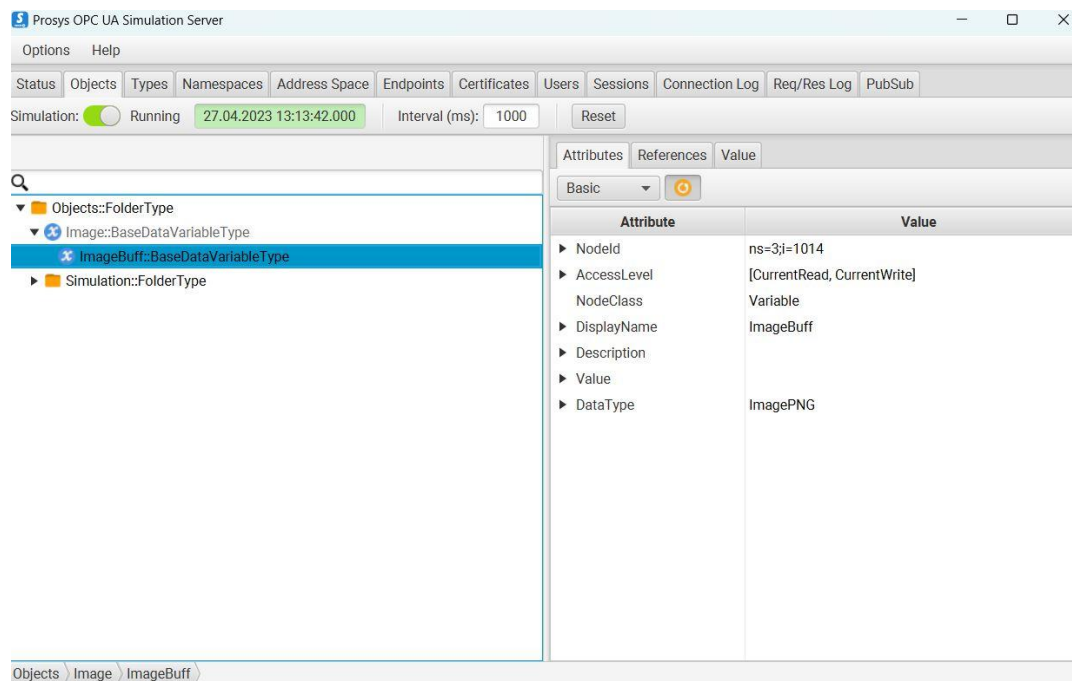


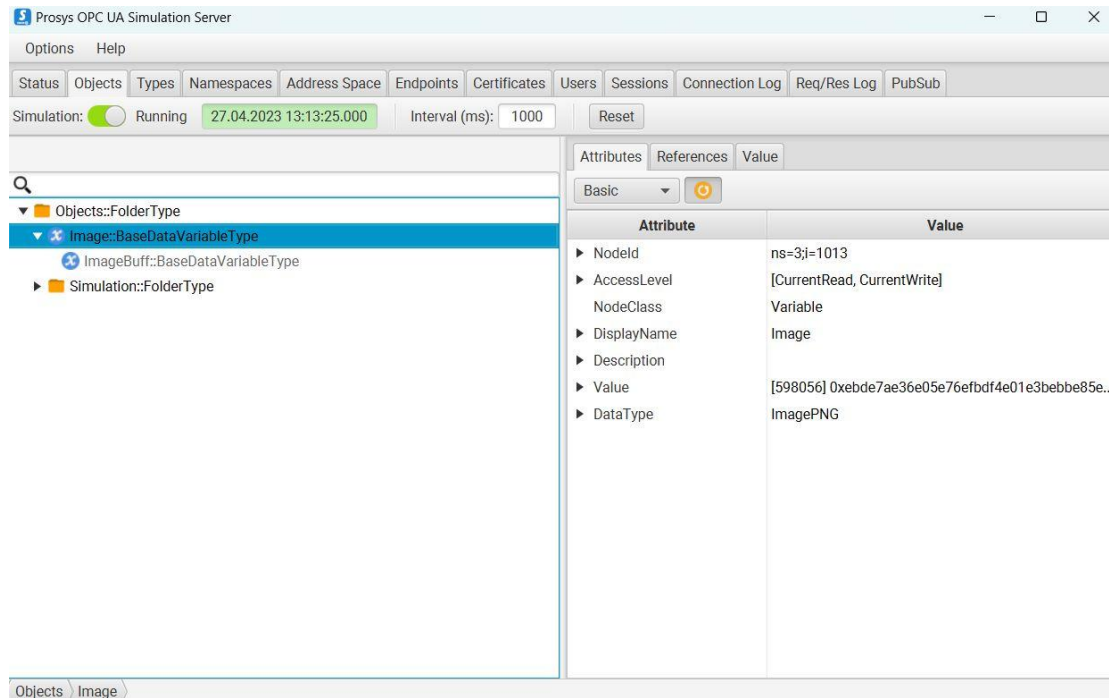
← April 27, 2023





In this scenario, we see that the person is not wearing a face mask, so the AI/ML Model will also be detecting this and the light will not be switched on in this case.





This is the OPC UA Server where the image is being sent to the Server and being stored.

This image will then be sent to the Node Red Cloud.

Challenges

- Forming a connection to the Node MCU and making the circuit has been a problem, as it was not connecting most of the time.

- Completing the MQTT protocol was also a major issue, as sometimes the message was getting delayed and was not being synchronized.
- Training the ML model with the huge dataset was also an issue, as it takes a huge computing power and time, so that the model can identify all the different types of masks.
- The Arduino code proved to be a bit tricky, when we were trying to synchronize between the sensor and the camera, sometimes the camera module would delay while taking pictures and we would receive a delayed input to the server.
- The camera module component was also an issue, as we could not make the Arduino camera module work and had to use ESP 32 Camera module.