

INTERNET OF THINGS

~Focal length

Group 15~

Rishabh Agrawal 2020102038

Gokulraj R 2020102042

Rohan Gupta 2020112022

Sreya Garapati 2020102055

Sushil Kumar Yalla 2020102071



PROBLEM
STATEMENT



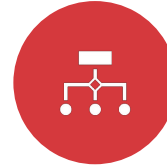
BLOCK
DIAGRAM



SELECTION
OF
COMPONENTS



CIRCUIT
DIAGRAM



FLOW CHART
FOR CODE



DASHBOARD



USER
MANUAL

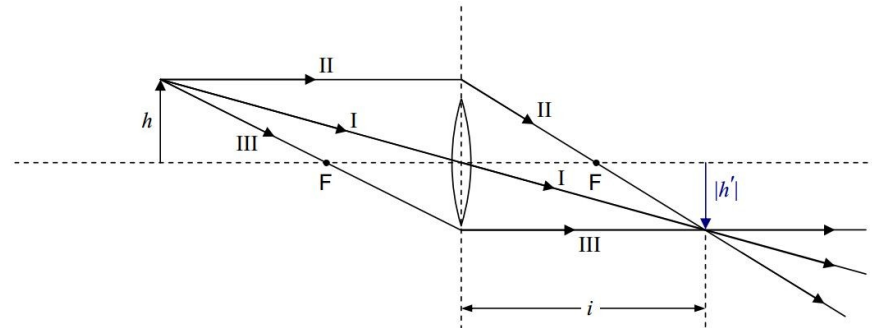
INDEX

PROBLEM STATEMENT

The aim of the project is **To find the focal length of a given lens** by observing the sharpness of the image formed on the screen.

Focal length length can be simply calculated using lens formula:

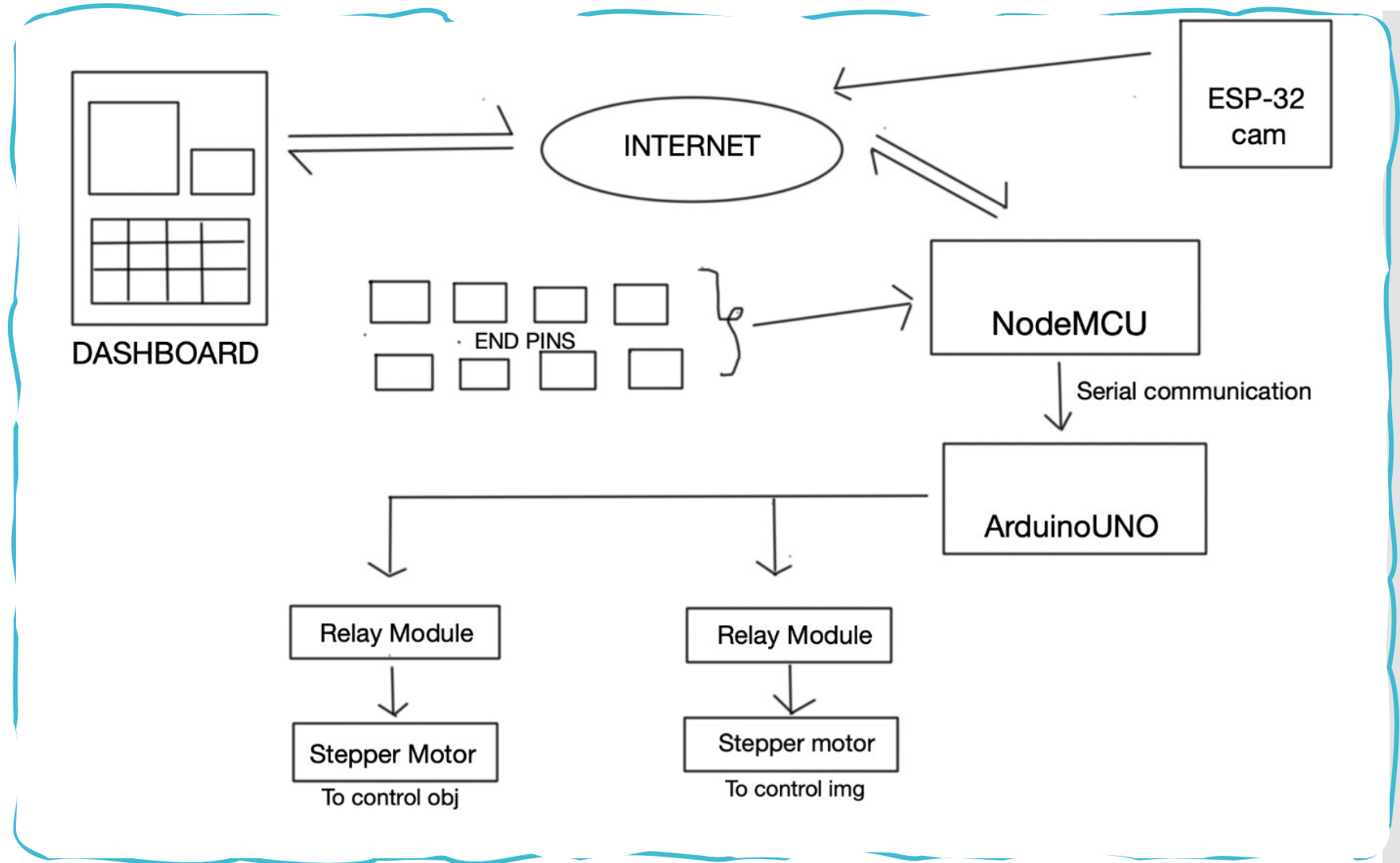
$$1/v - 1/u = 1/f$$



Here, v and u are distances of the image and the object in the direction of object to lens.

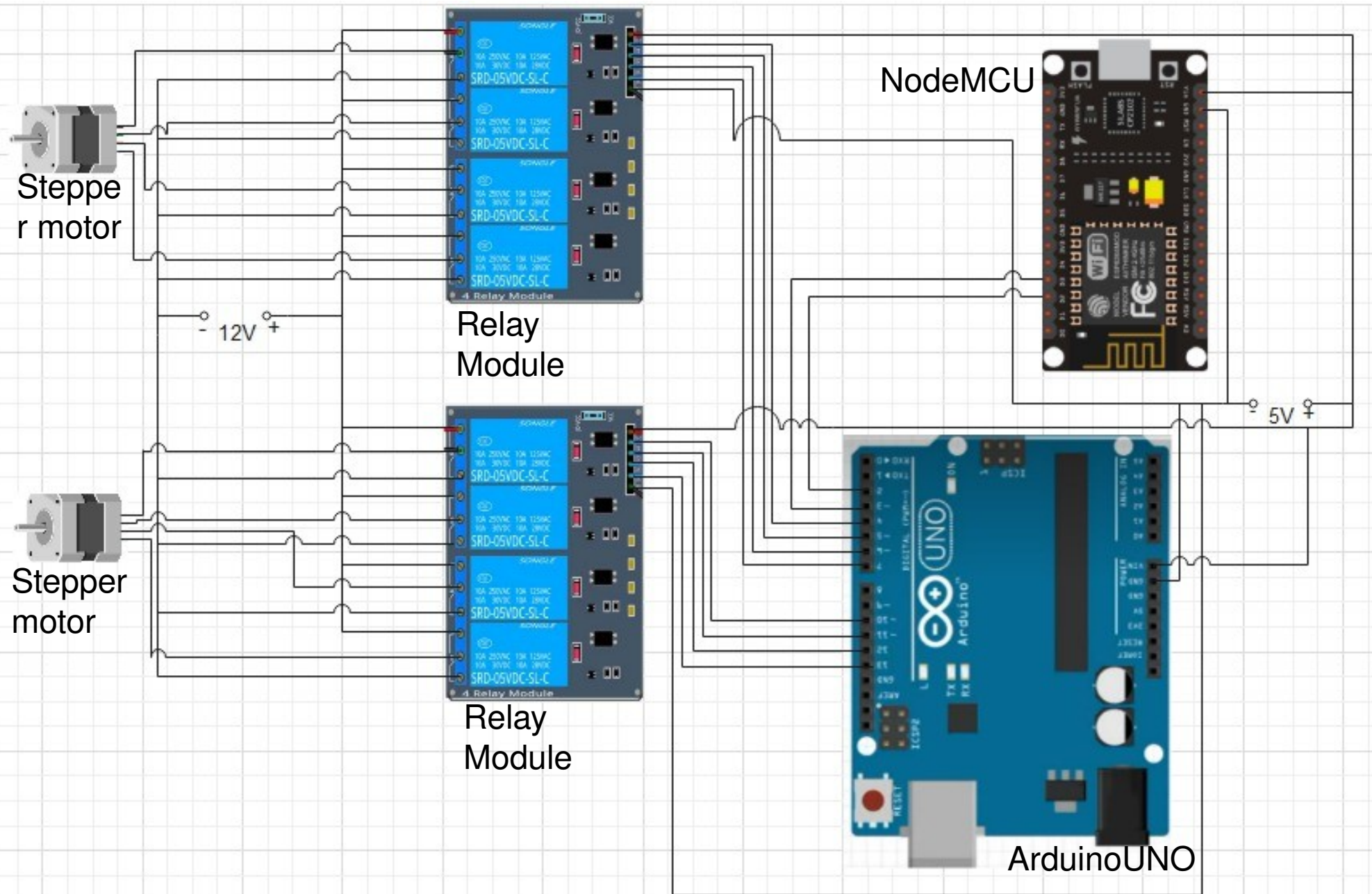
After placing the object at an arbitrary u distance from the lens, we move the screen such that a sharp image is formed on the screen. This distance of screen from the lens is taken as v .

BLOCK DIAGRAM



CIRCUIT

DIAGRAM



SELECTION OF COMPONENTS

Node MCU

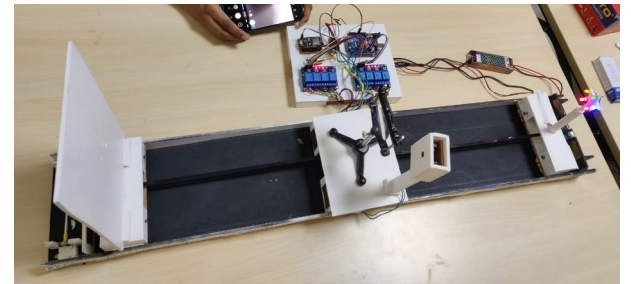
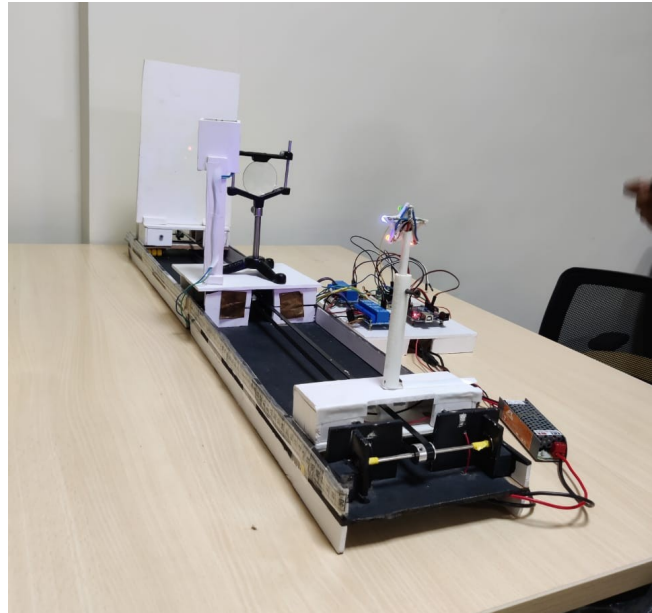
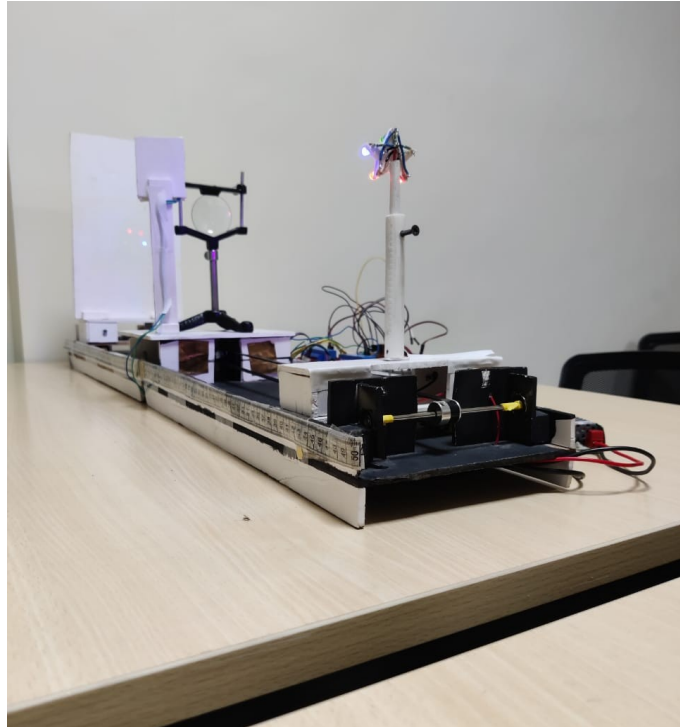
- Node MCU (ESP2866) has inbuilt WIFI module and have multiple GPIO pins .
- It's a cheap microcontroller and easy to use.

Arduino UNO

- Because Node MCU have limited pins and they work on 3.3 volts using Arduino was our preference
- GPIO pins in Arduino give 5 volts output which is further used to control relays.

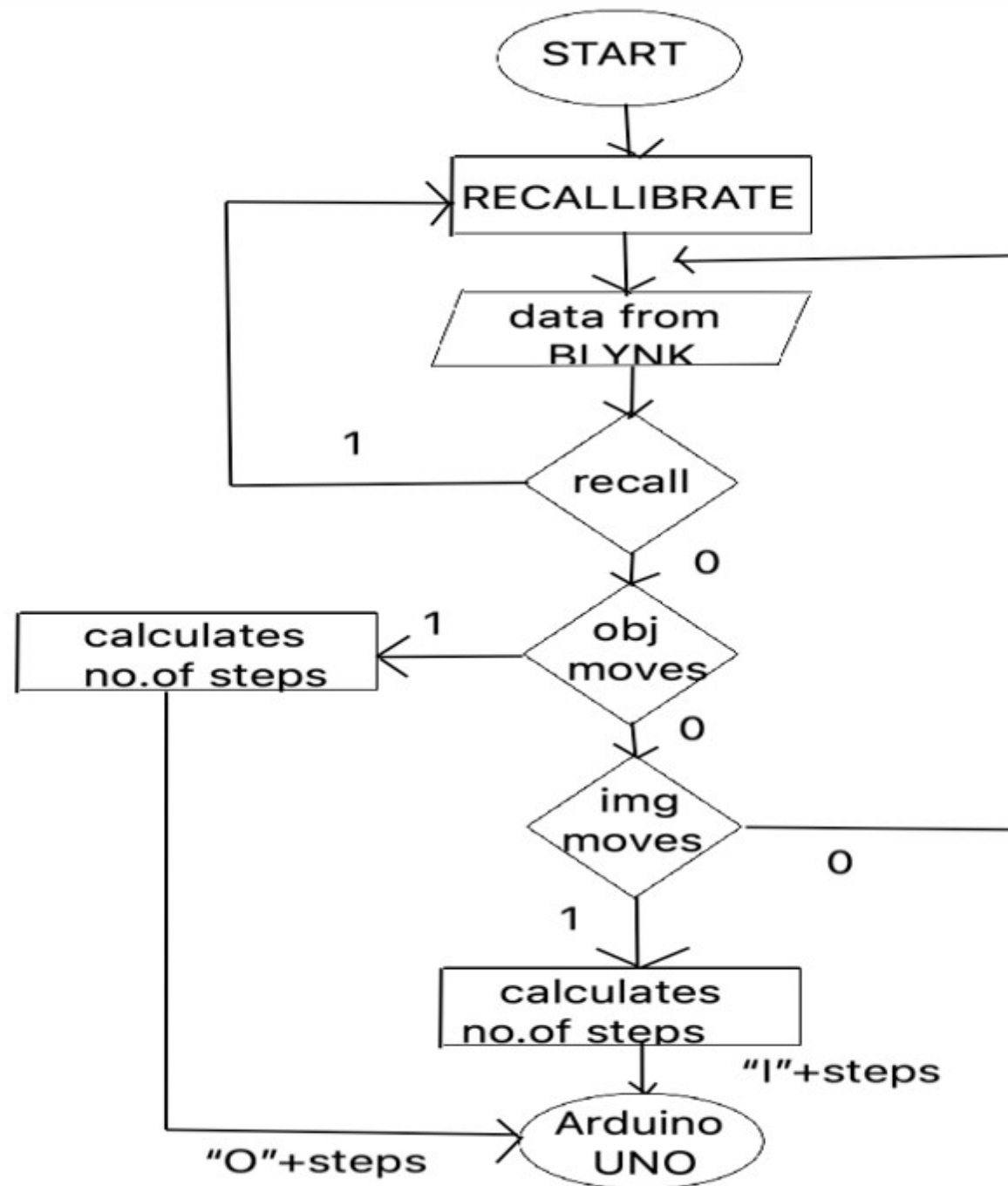
Relays

- We used relays instead of drivers because stepper motors draw more power as compared to the power supported by drivers
- There are few drivers which support higher power rating, but we used relays as they were cheap and easily available.



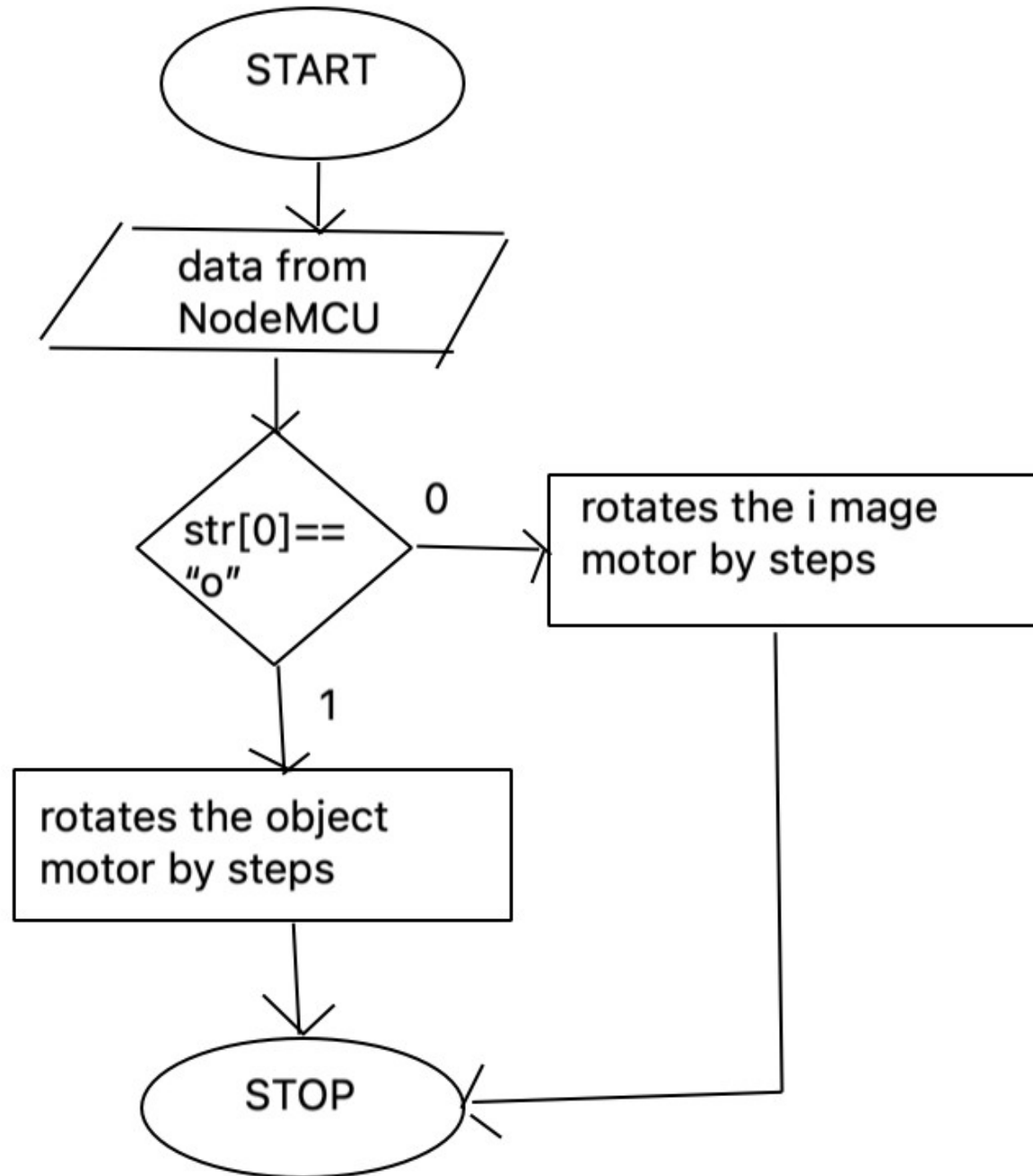
FLOW CHART FOR THE CODE

CODE FOR Node MCU



FLOW CHART FOR THE CODE

CODE FOR Arduino
UNO

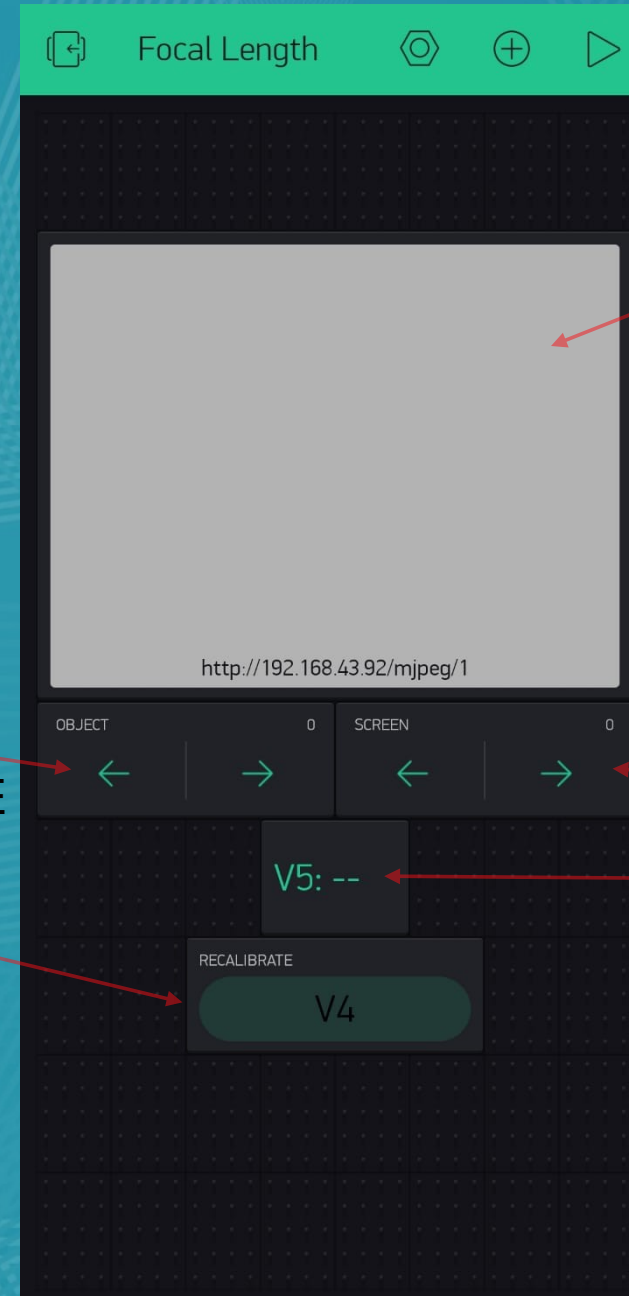


DASHBOARD

We chose Blynk over other dashboard services primarily because it provides a free video streaming service and has user friendly interface for the developer as well as the client.

TO ADJUST THE
OBJECT DISTANCE

TO RECALIBRATE



VIDEO STREAMING

TO ADJUST THE
IMAGE DISTANCE

CALCULATED
FOCAL LENGTH

Key Features

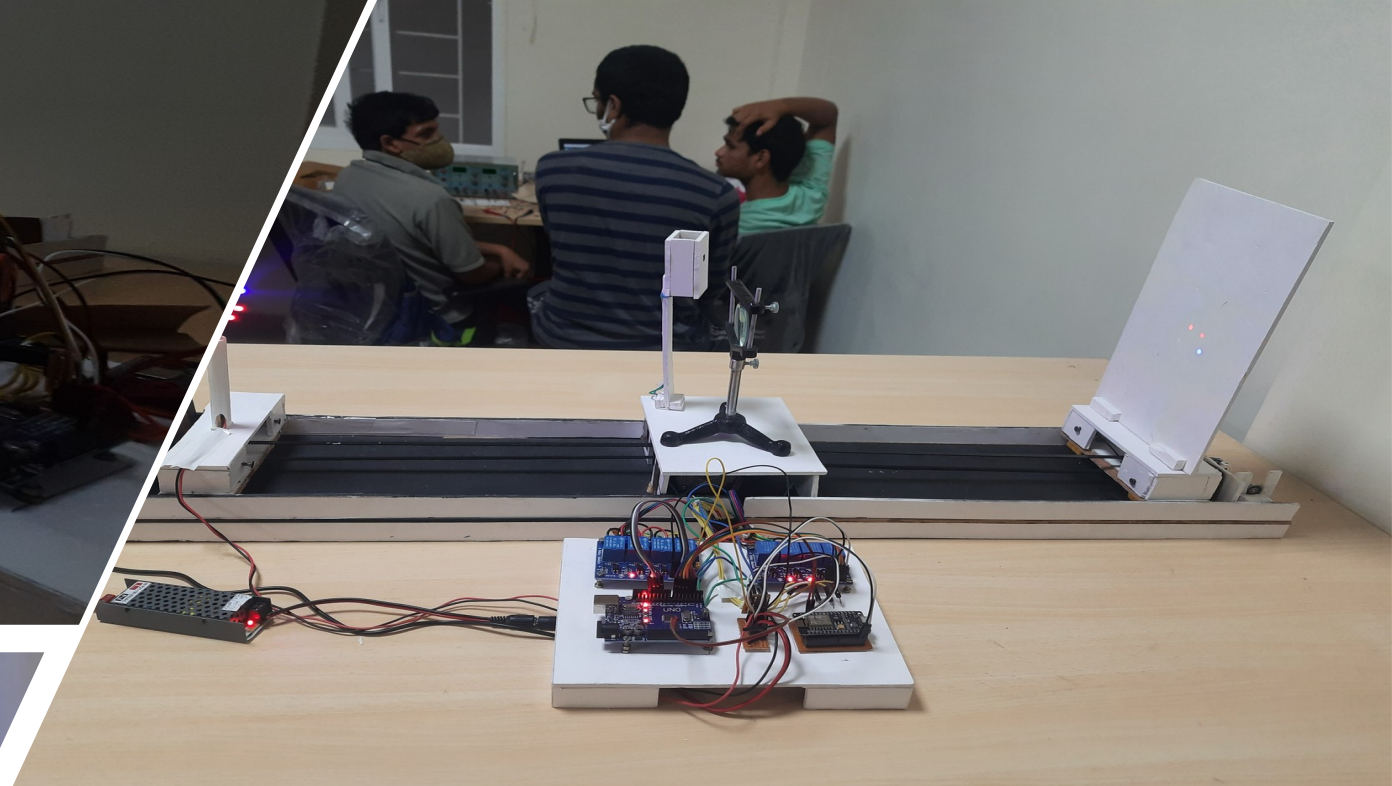
- Our model supports moving of two elements which makes its use universal.
- This also enables us to use our setup for conducting the experiment using other type of lenses and mirrors by making few simple changes in the code and model.
- Our model does not use sensors due to which you don't need to calibrate them everytime use.

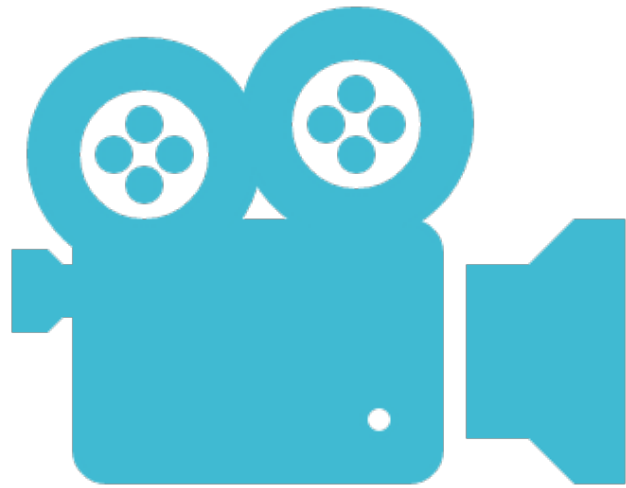
USER MANUAL

- Firstly, decide on the object distance and the distance using the arrows in the dashboard.
- Secondly, adjust the image distance using arrows such that the sharpest image is obtained on the screen seen from the video streaming.
- Now, the calculated focal length is shown on the dashboard.

****WARNING****

- Do not press the arrows constantly.
 - Keep in mind that there is a delay in the camera feed, record your observations accordingly
 - First, let the object/screen come to a stable position change the position accordingly.
 - Don't try to move the object/ screen directly on the setup.
- Reverse current can damage the other electronic components





Link to the video explaining the complete setup and the working RTL.

Our Team Members

