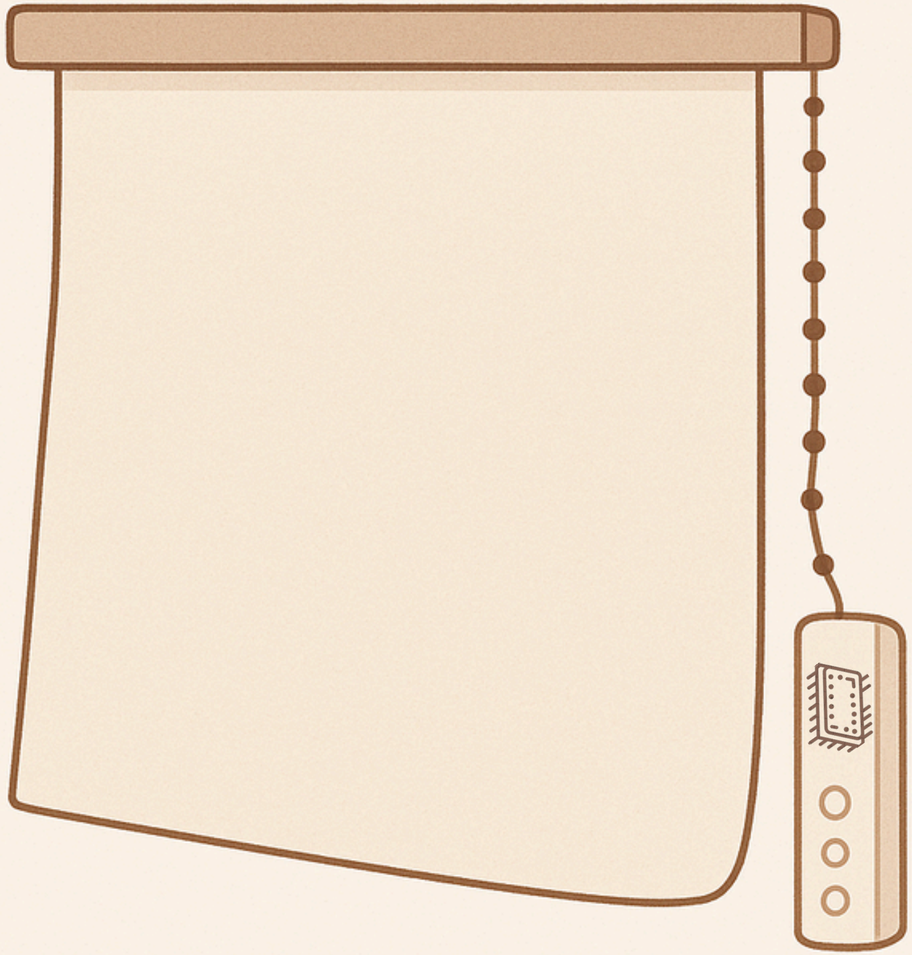
universidade de aveiro

C.O.R.T.I.N.A

(CONTROLLED OPENING/ RETRACTION TRIGGERED BY ILLUMINATION AND NATURAL-LIGHT ANALYSIS)



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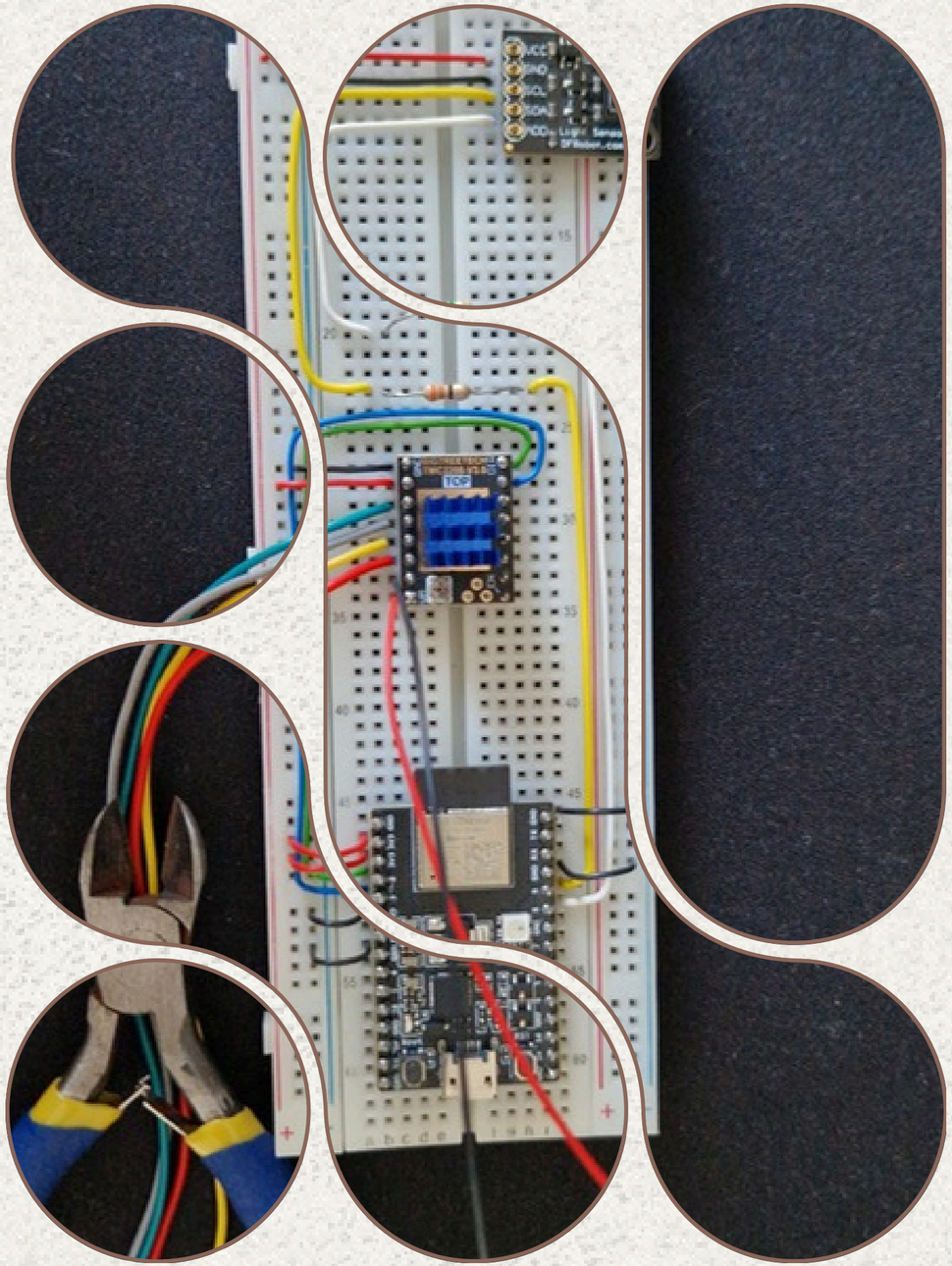
MECT
ASE 24/25



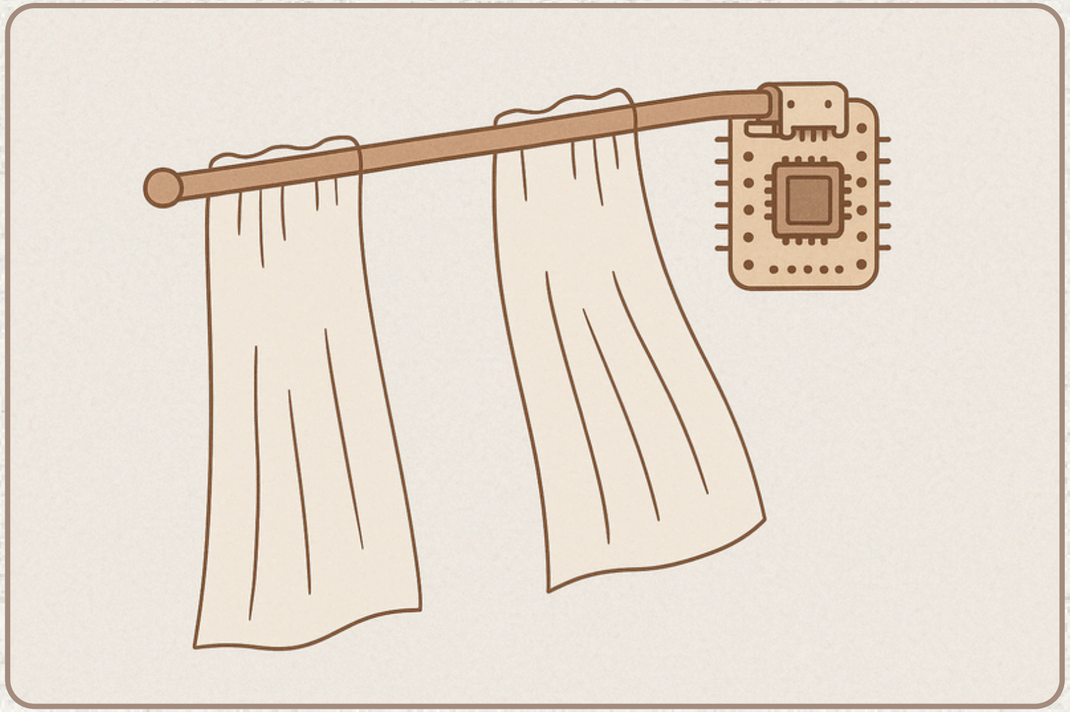
Intro

Smart homes are growing in popularity, with more people seeking wireless control and automation for everyday tasks. However, the high cost of commercial systems limits accessibility. DIY solutions offer a more affordable, flexible alternative for those looking to build custom smart home setups.

This project presents a solution to a problem that doesn't exist.

Use Case

- In a smart home, an automated curtain system that adjusts it's opening based on ambient light and also with user control remotely.



Features

Automatic curtains based on light present in the room

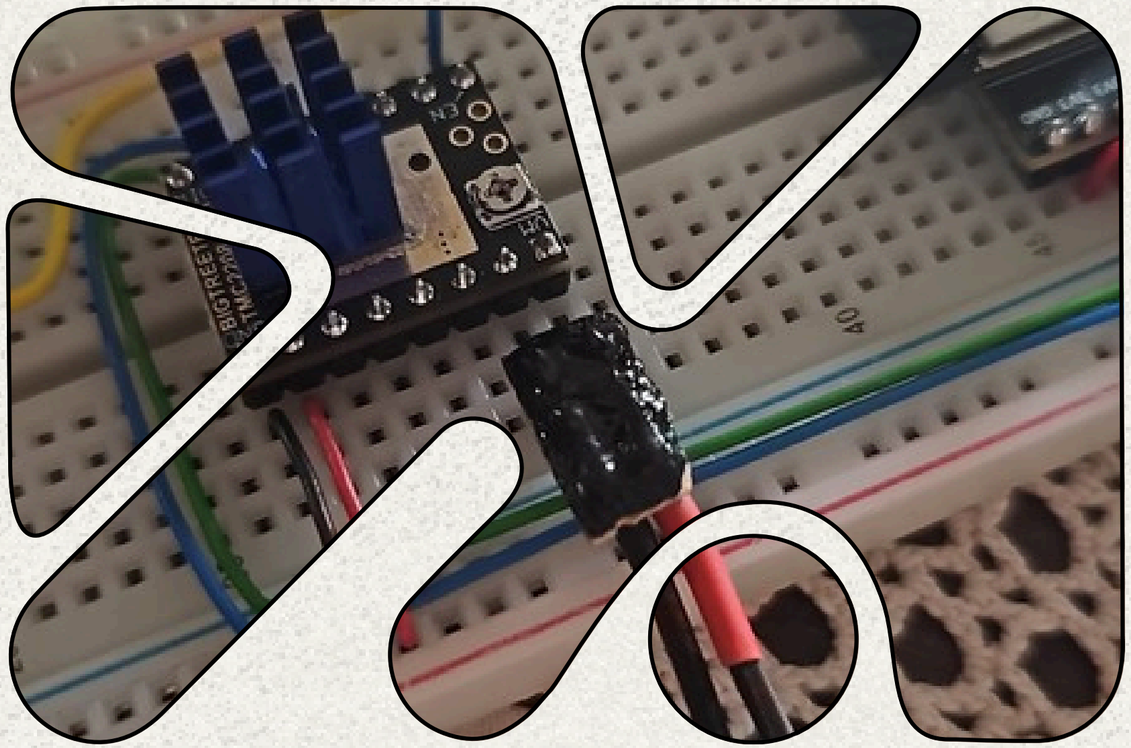
WiFi Connection

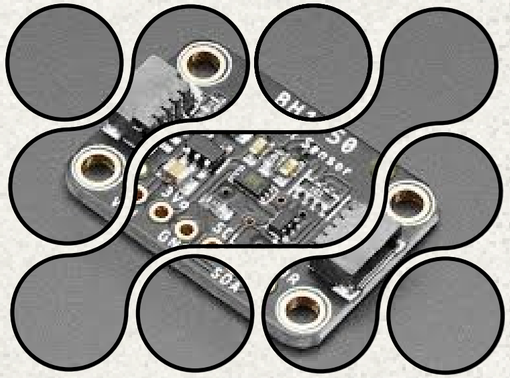
User Control with WiFi using phone

Tools

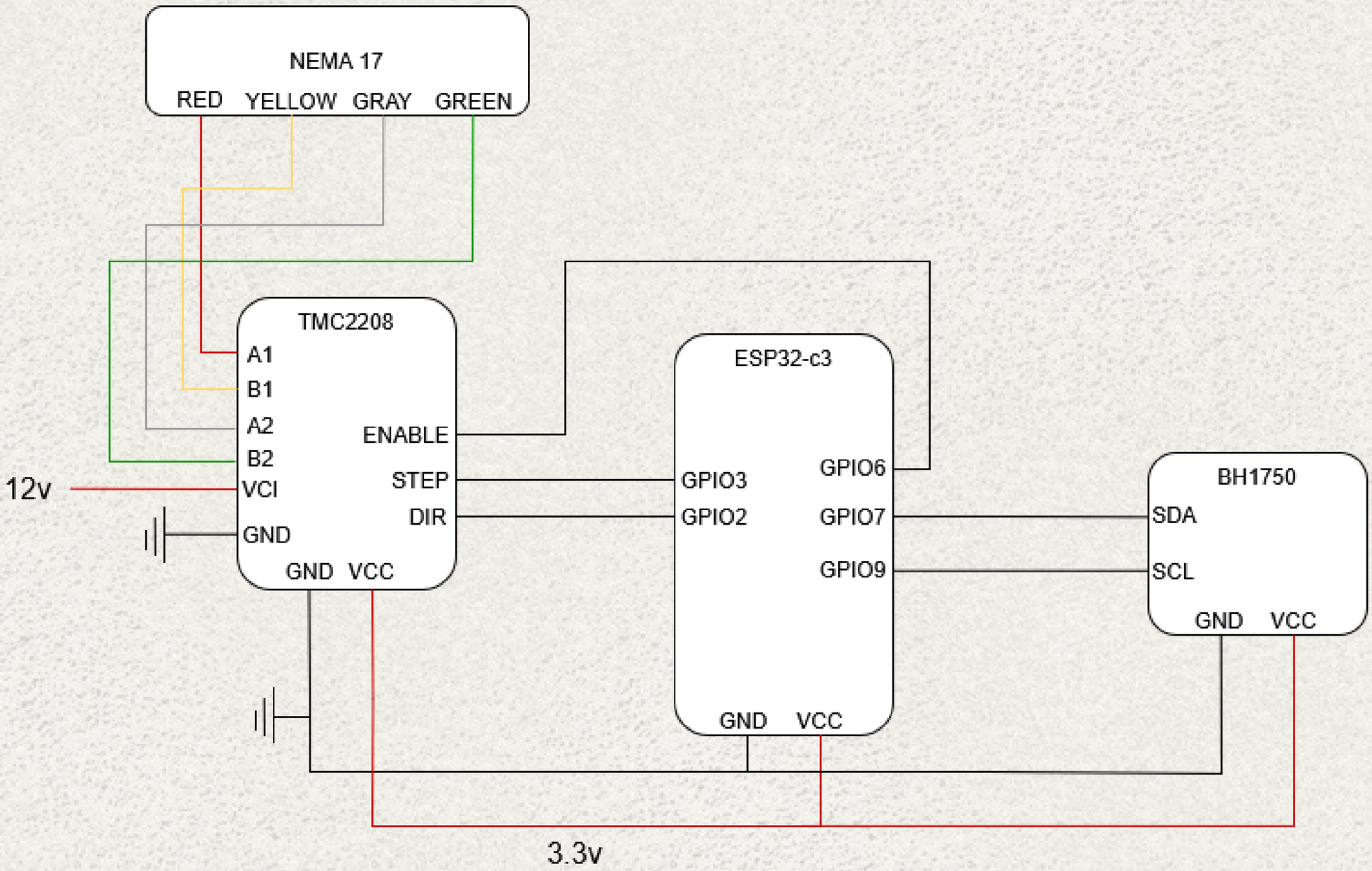
HARDWARE
ESP32-c3
TMC2208
NEMA 17
BH1750

Communication
WiFi
ESP RAINMAKER
I2C

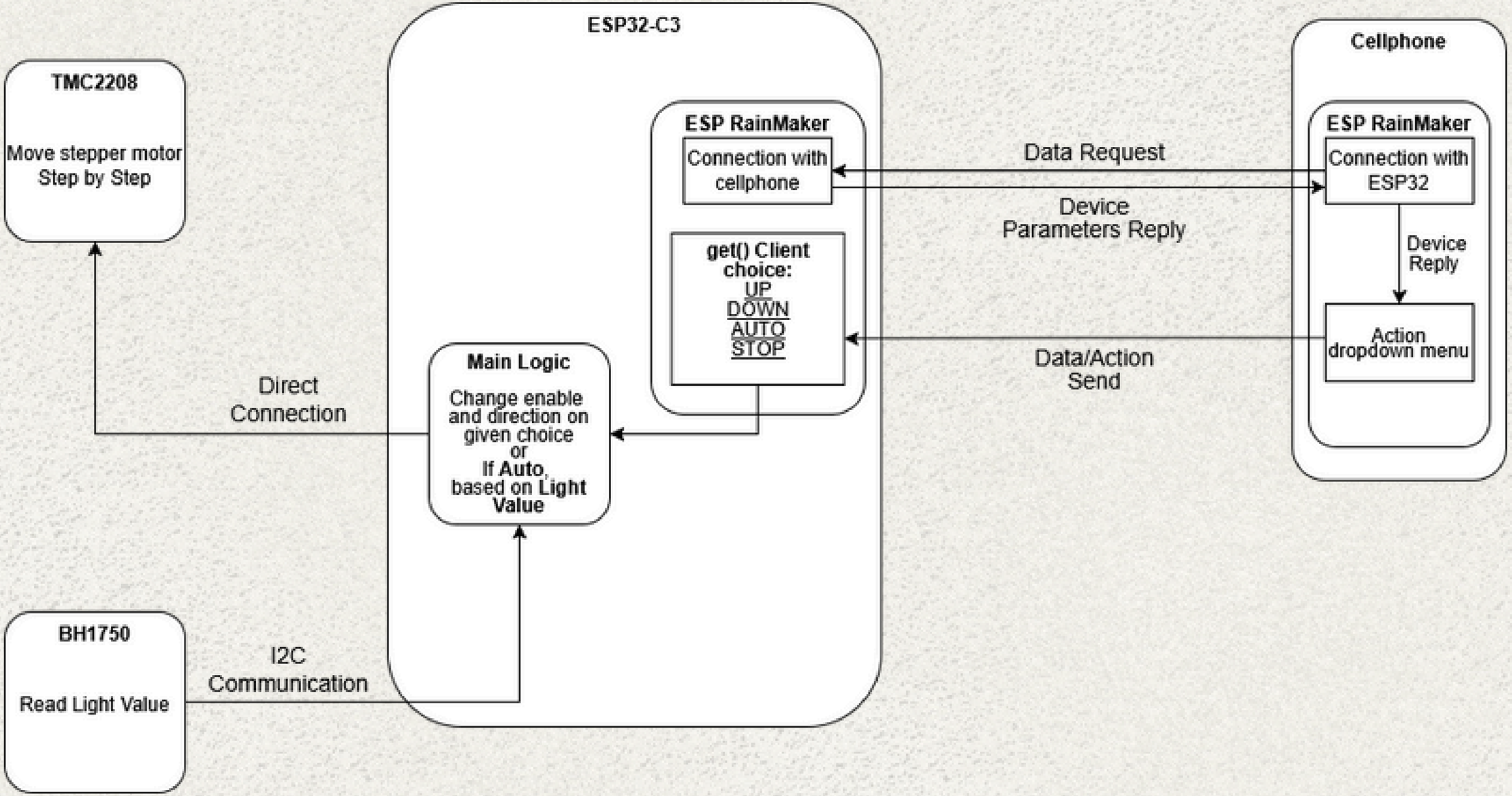




HARDWARE


NEMA 17
RED
YELLOW
GRAY
GREEN
TMC2208
A1
B1
A2
B2
VCI
GND
ENABLE
STEP
DIR
GND
VCC
12v
ESP32-c3
GPIO3
GPIO2
GPIO6
GPIO7
GPIO9
GND
VCC
BH1750
SDA
SCL
GND
VCC
3.3v

SOFTWARE

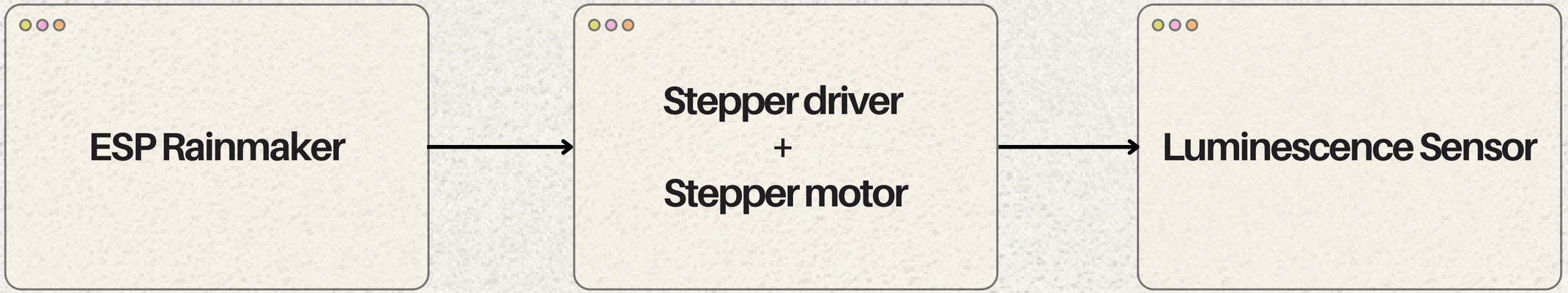

ESP32-C3
TMC2208
Move stepper motor Step by Step
ESP RainMaker
Connection with cellphone
get() Client choice:
UP
DOWN
AUTO
STOP
Main Logic
Change enable and direction on given choice
or
If Auto, based on Light Value
Direct Connection
BH1750
Read Light Value
I2C Communication
Data Request
Device Parameters Reply
Data/Action Send
Cellphone
ESP RainMaker
Connection with ESP32
Device Reply
Action dropdown menu

Test Methodology

General test methodology followed:

- Individual component testing
- Building the software for that component (what could be done independently)

Order of components integration



DEMO

Further Improvements

- Better and smaller case
- Faster stepper speed
- Make it available across networks

M.E.R.C.I

(Motorized Environmental Response to C.O.R.T.I.N.A Illumination)

(Controlled Opening/Retraction Triggered by Illumination and Natural-light Analysis)