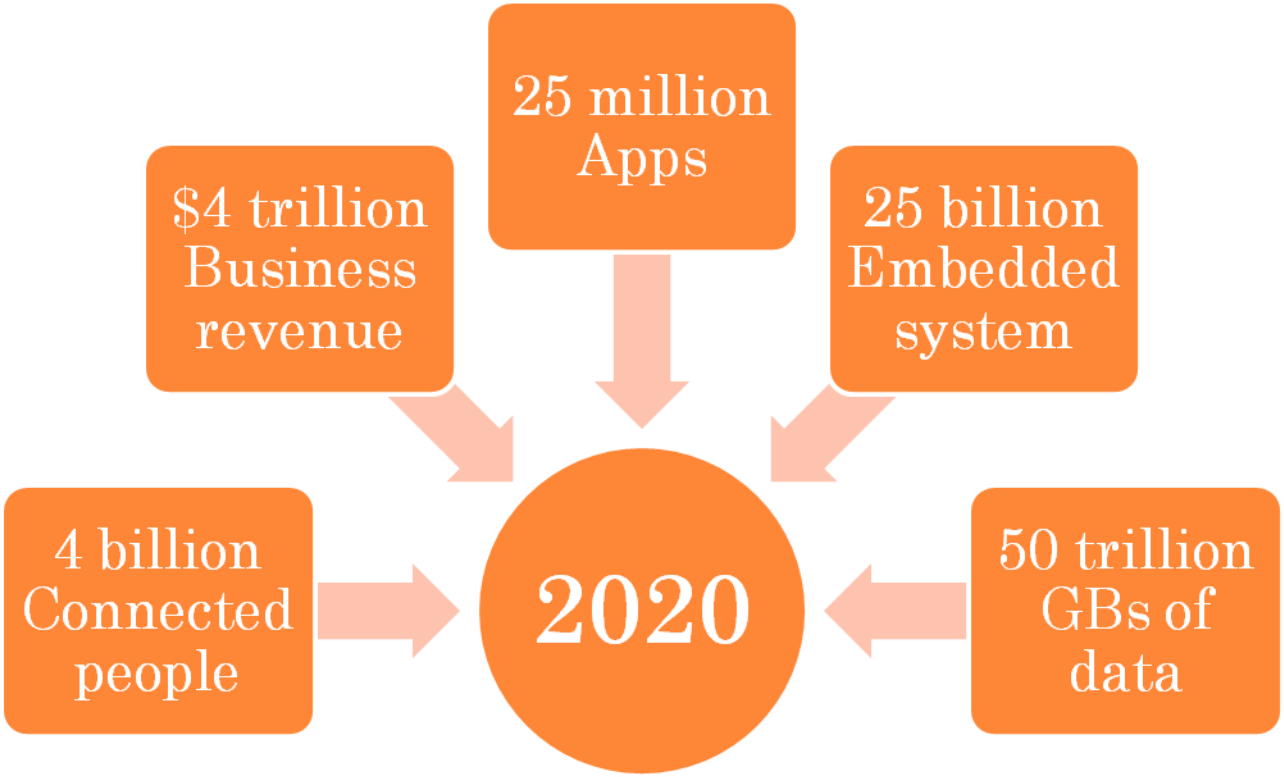
IOT AUTOMATION

Controlling and monitoring devices over the internet through AI

WHAT IS IOT?

- Internet of things is the concept of connecting physical devices over the internet.
- Just imagine controlling and monitoring any hardware from anywhere in the world without physical intervention.
- And you can literally chat with your hardware on Facebook !

WHY IOT?


25 million Apps
$4 trillion Business revenue
25 billion Embedded system
4 billion Connected people
2020
50 trillion GBs of data

OUR PROJECT

- We have seperated our project into three modules each integrated with Google Assistant and an AI Facebook chatbot.
- Module 1: Home automation, being able to control domestic appliance over the internet.
- Module 2: Motor control, Speed and polarity control of a dc motor.
- Module 3: Live sensor feed: Monitoring real time data from a physical sensor anywhere in the world.

PLEASE OPEN FACEBOOK AND SEARCH

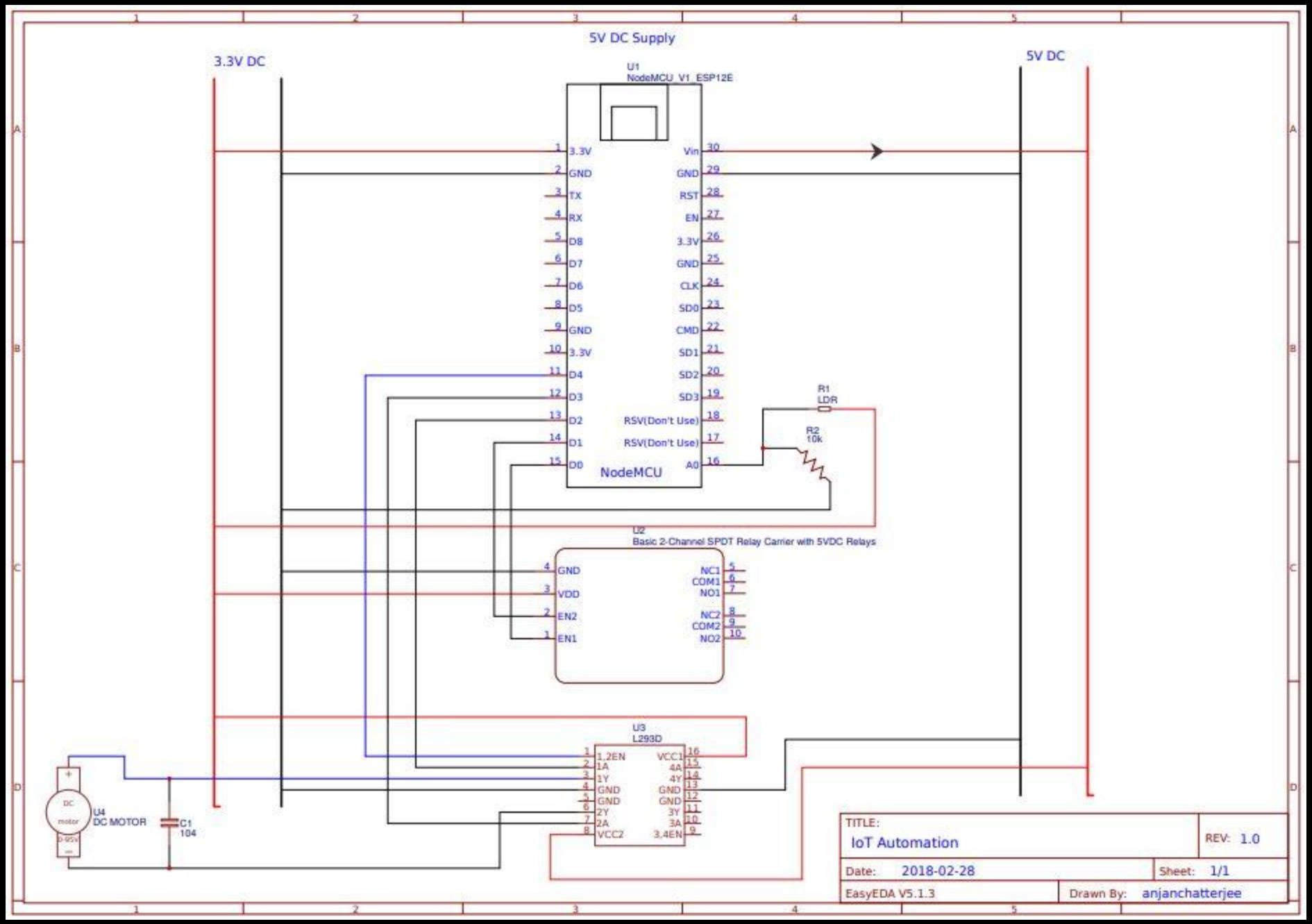
"IOT AUTOMATION"

HARDWARE

- Node MCU using ESP8266
- 5V relay
- DC motor
- L293d
- LDR
- LM35
- Connecting wires

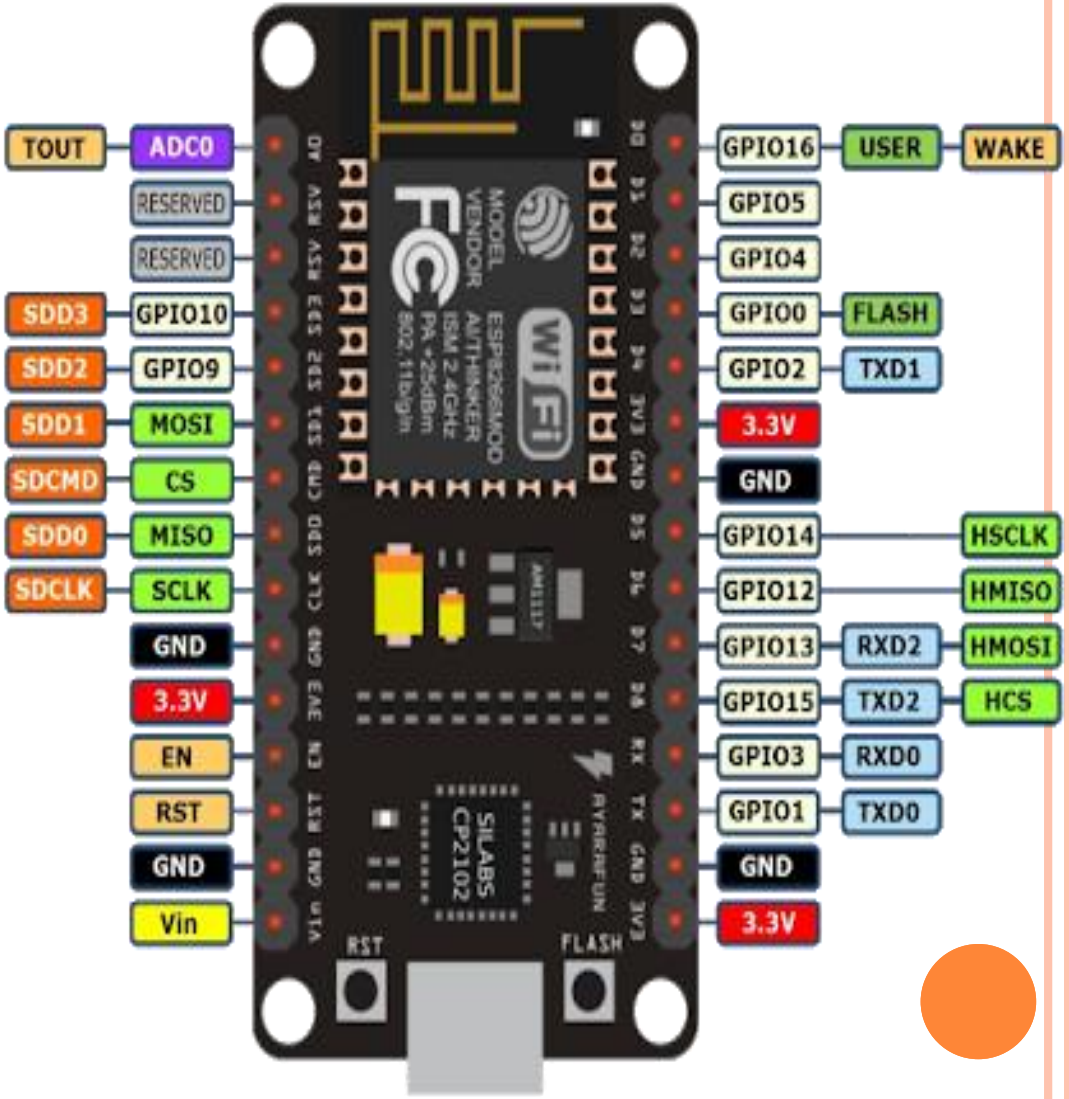
SOFTWARE

- ESP8266 can be coded with its own Lua script but here we are using Arduino IDE.
- MQTT protocol is used for communication.
- Adafruit broker provides the cloud platform.
- IFTTT is used to code Google Assistant (or any AI).
- Chatfuel is used to create an AI to chat with connected devices.


5V DC Supply
3.3V DC
5V DC
U1
NodeMCU_V1_ESP12E
1 3.3V
2 GND
3 TX
4 RX
5 D8
6 D7
7 D6
8 D5
9 GND
10 3.3V
11 D4
12 D3
13 D2
14 D1
15 D0
Vin 30
GND 29
RST 28
EN 27
3.3V 26
GND 25
CLK 24
SD0 23
CMD 22
SD1 21
SD2 20
SD3 19
RSV(Don't Use) 18
RSV(Don't Use) 17
A0 16
NodeMCU
R1
LDR
R2
10k
U2
Basic 2-Channel SPDT Relay Carrier with 5VDC Relays
4 GND
3 VDD
2 EN2
1 EN1
NC1 5
COM1 6
NO1 7
NC2 8
COM2 9
NO2 10
U3
L293D
1 1,2EN
2 1A
3 1Y
4 GND
5 GND
6 2Y
7 2A
8 VCC2
VCC1 16
4A 15
4Y 14
GND 13
GND 12
3Y 11
3A 10
3,4EN 9
U4
DC MOTOR
C1
104
TITLE:
IoT Automation
REV: 1.0
Date: 2018-02-28
Sheet: 1/1
EasyEDA V5.1.3
Drawn By: anjanchatterjee

NODE MCU

- Runs on 5V DC, it is the cheapest, most effective and open source Wi-Fi based microcontroller powered by ESP8266.
- ADC can be increased with a Multiplexer

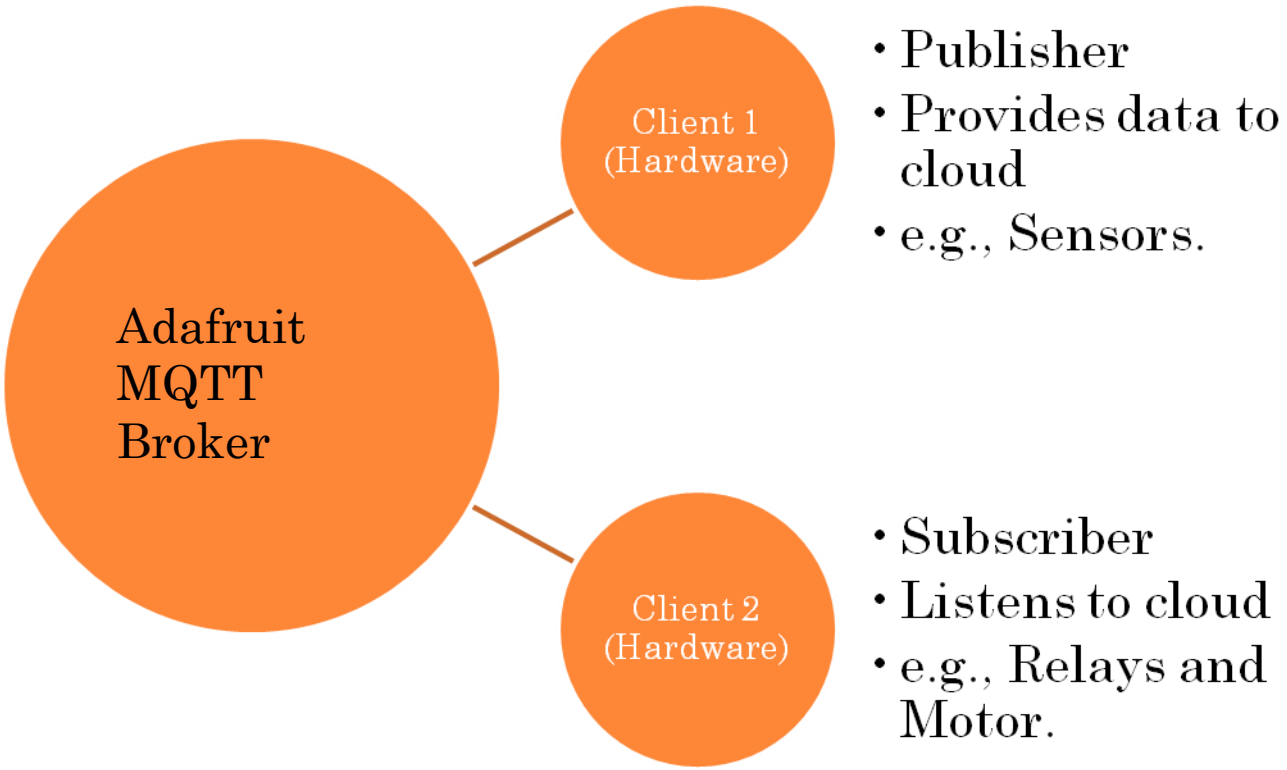


MQTT

- Message Queue Telemetry Transport
- Developed by IBM
- Light weight
- Open source

MQTT

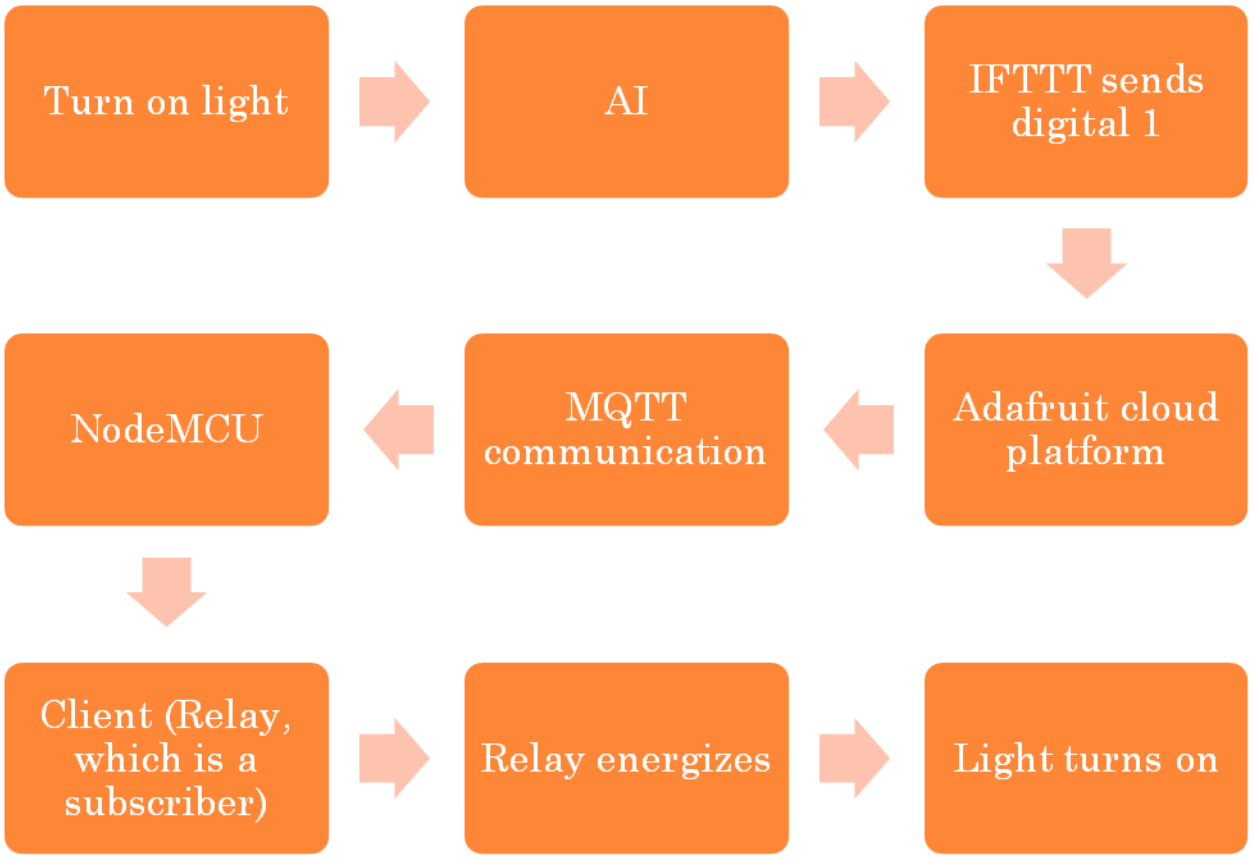
- How does it work?



IFTTT

- If this then that
- If Google Assistant receives a command, then send data to Adafruit.
- This data might be digital (1 or 0) for switching purpose or analog (0 to 1023) for PWM control of motor.

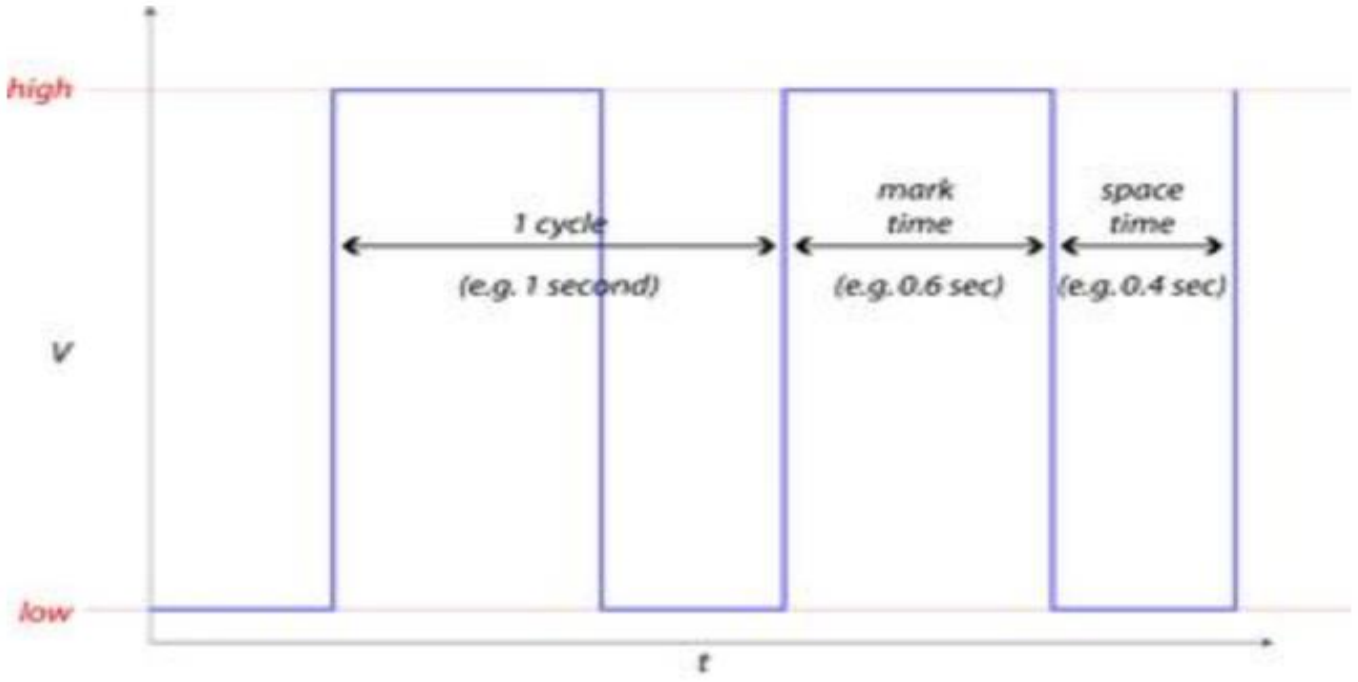
FLOWCHART


Turn on light
AI
IFTTT sends digital 1
Adafruit cloud platform
MQTT communication
NodeMCU
Client (Relay, which is a subscriber)
Relay energizes
Light turns on

MOTOR CONTROL

- Motor control is performed by PWM.
- Pulse width modulation occurs by changing the duty cycle of the motor.
- Motor speed can be changed by varying the on time (analogWrite) at the enable pin of motor driver.
- Motor polarity can be changed by interchanging High or Low (digitalWrite) at the input pins of driver.

PWM



The speed is related by the following equation

$$N = V - Ia\,Ra / k\Phi$$

Where can it be used?

- Healthcare (<60% heart ailments)
- Manufacturing
- Automobile (Autonomous vehicles)
- Home automation

FUTURE ASPECTS

- Implementing Social Network into IoT brings in the concept of SIoT.
- Just imagine the concept where devices have a social platform to communicate.
- Blockchain would provide revolution in IoT security.
- Together BlockChain and SN could bring innovation in Automation.

THANK YOU !