

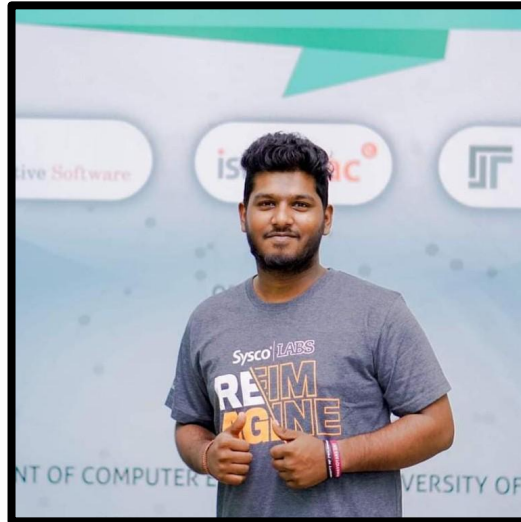
Smart Vending Machine

Milestone 2

Group 01



Suppysamy Bragadeeshan
E/16/055

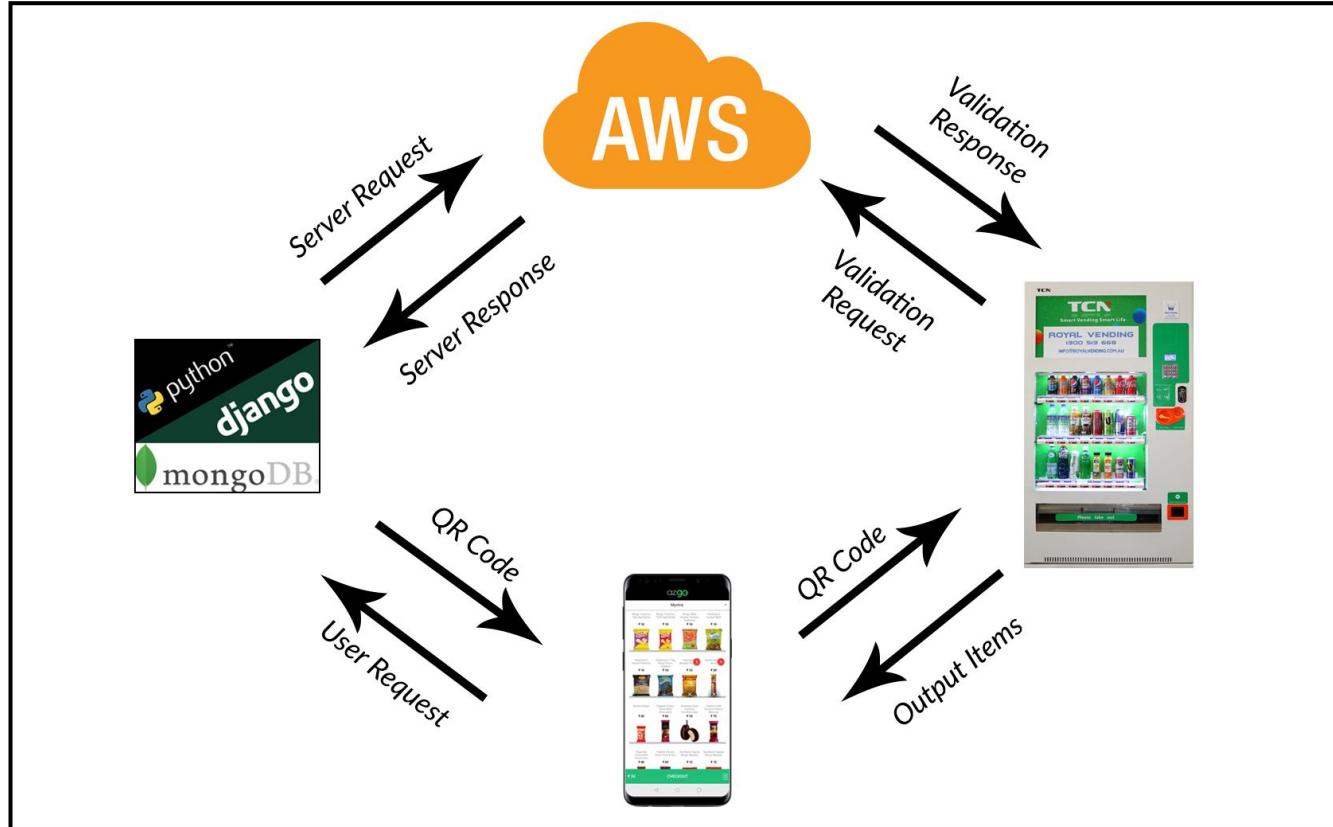


Selvaratnam Girishikan
E/16/115



Vettrivel Harikaran
E/16/172

Solution Overview



Mechanics of the project

AFTER THE DELIVERY DOOR IS CLOSED THE ELEVATOR RETURNS TO THE 'STANDBY' POSITION

- SAFETY - THE DELIVERY DOOR FLAP **MUST** BE CLOSED BEFORE THE ELEVATOR CAN MOVE
- AS THE ELEVATOR STARTS TO MOVE UP THE DELIVERY DOOR FLAP IS LOCKED CLOSED

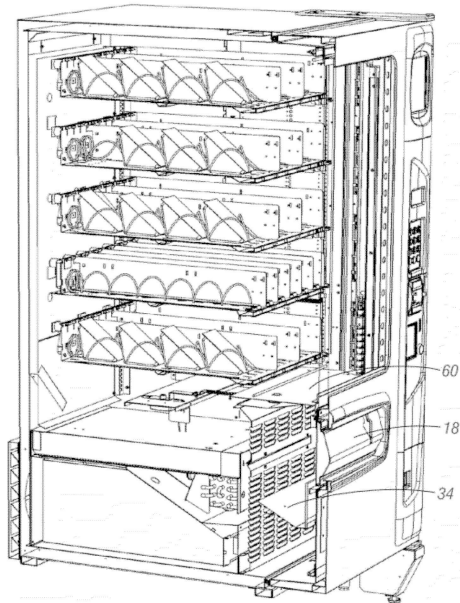


Fig. 10A

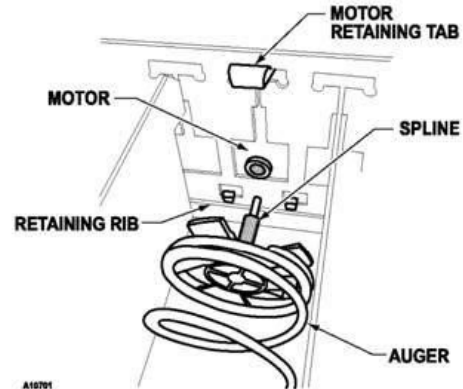
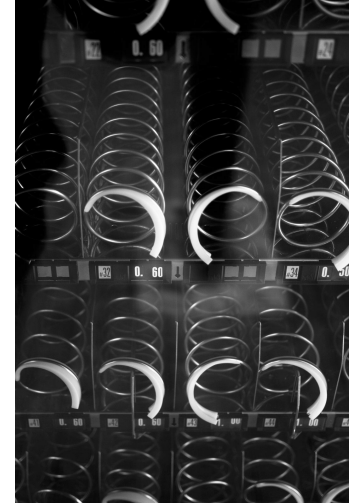


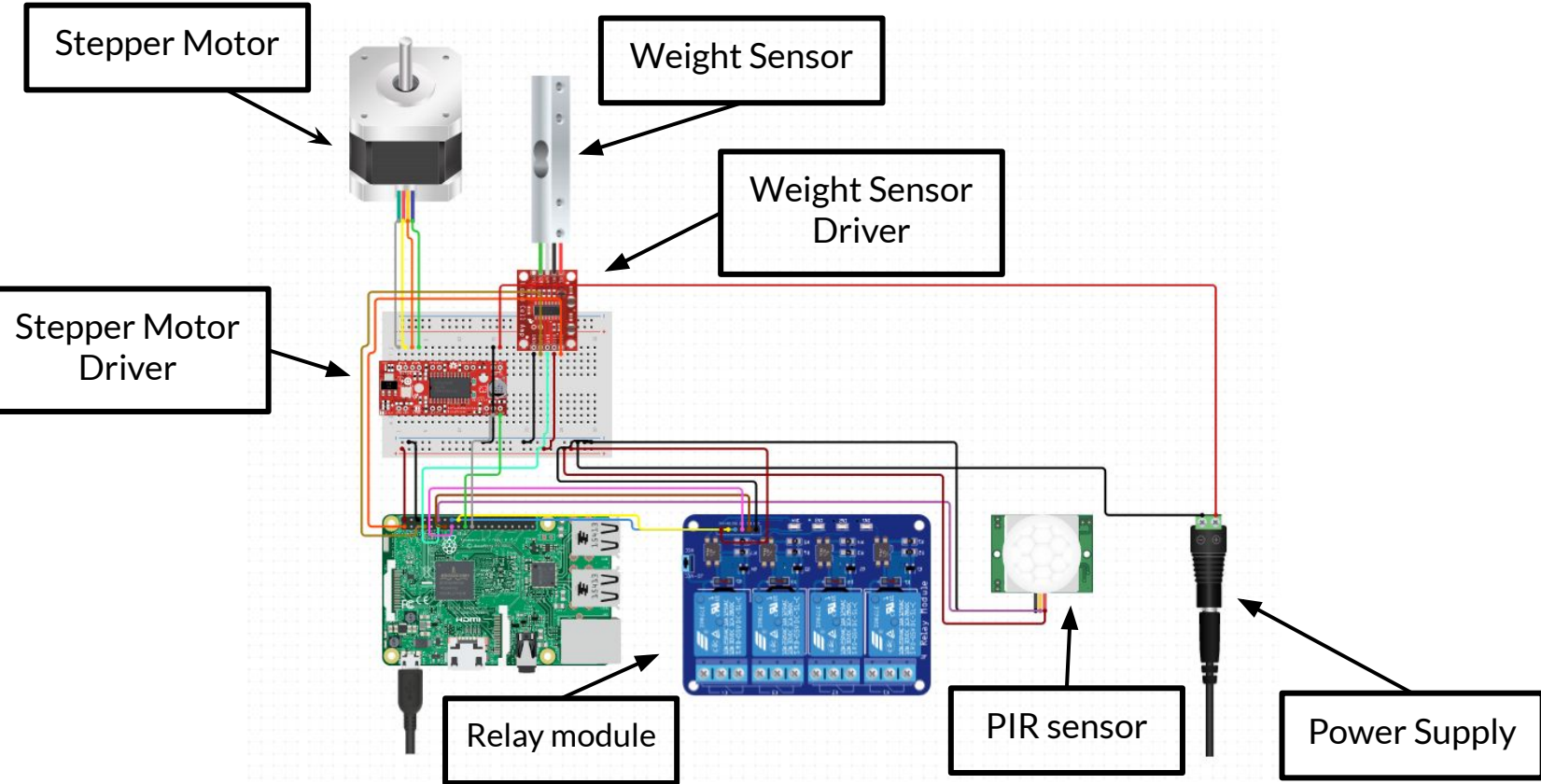
Figure 8. Auger Timing



Hardware Components

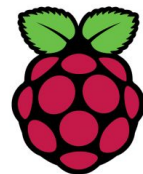
- Raspberry Pi 3
- Stepper Motor
- Stepper motor driver
- Camera Module V2 for Raspberry Pi
- Relay Module
- Weight Sensor
- PIR sensor

Circuit Diagram



Raspberry Pi 3

- Broadcom BCM2837 64bit ARMv7 Quad Core Processor powered Single Board Computer running at 1.2GHz
- 1GB RAM
- BCM43143 WiFi on board Bluetooth Low Energy (BLE) on board
- 40pin extended GPIO , 4 x USB 2 ports 4 pole
- Stereo output and Composite video port Full size HDMI
- CSI camera port for connecting the Raspberry Pi camera
- Upgraded switched Micro USB power source (now supports up to 2.4 Amps) Expected to have the same form factor as the Pi 2 Model B, however the LEDs will change position

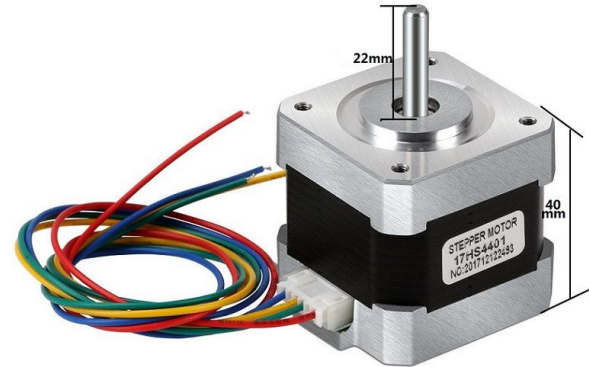


Raspberry Pi

NEMA 17HS4401 Bipolar Stepper Motor

Electrical Specification:

- Motor Type: Bipolar Stepper
- Step Angle: 1.8 deg.
- Holding Torque: 40N.cm (56oz.in)
- Rated Current/phase: 1.7A
- Phase Resistance: 1.5Ohm \pm 10%
- Insulation Resistance: 100M Ω , Min, 500VDC
- Insulation Strength: 500VAC for one minute

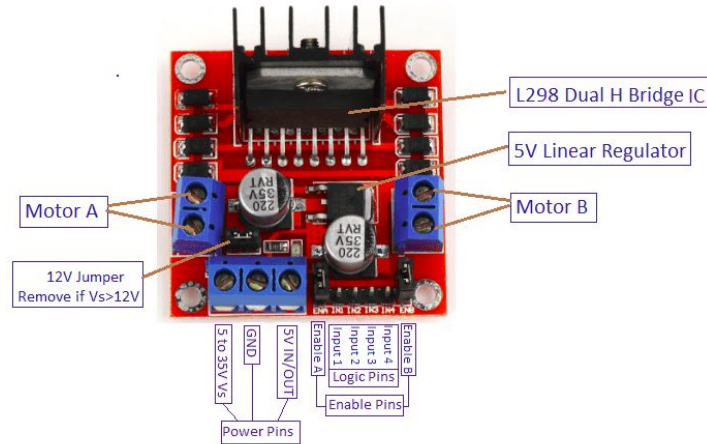


stepper motor provides a constant holding torque without the need for the motor to be powered. Steppers provide precise positioning and repeatability of movement since good stepper motors have an accuracy of 3 – 5% of a step and this error is non-cumulative from one step to the next.

L298N Stepper Motor Driver

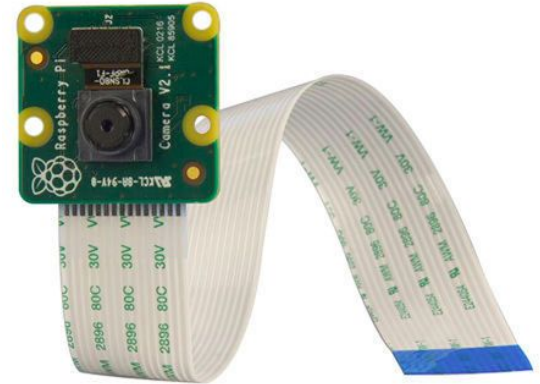
L298N Module Features & Specifications:

- Driver Model: L298N 2A
- Driver Chip: Double H Bridge L298N
- Motor Supply Voltage (Maximum): 46V
- Motor Supply Current (Maximum): 2A
- Logic Voltage: 5V
- Driver Voltage: 5-35V
- Driver Current: 2A
- Logical Current: 0-36mA
- Maximum Power (W): 25W
- Current Sense for each motor
- Heatsink for better performance



5MP Camera Board for Raspberry Pi

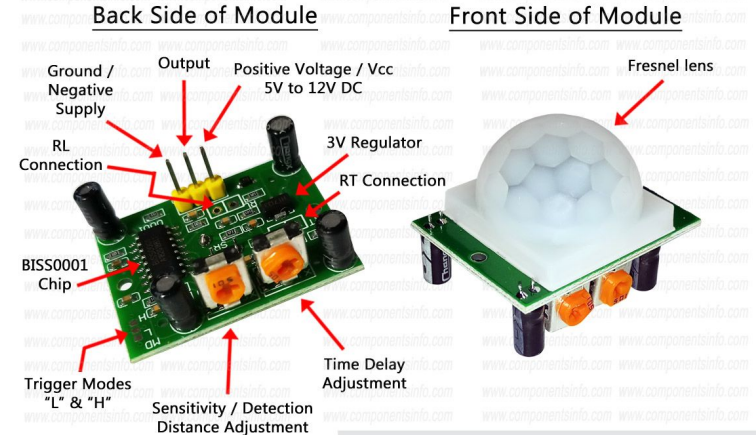
- 5 megapixel native resolution sensor-capable of 2592 x 1944 pixel static images.
- Supports 1080p30, 720p60 and 640x480p60/90 video.
- **Camera** is supported in the latest version of **Raspbian**, Raspberry Pi's preferred operating system.



HC SR501 PIR Motion Sensor Module

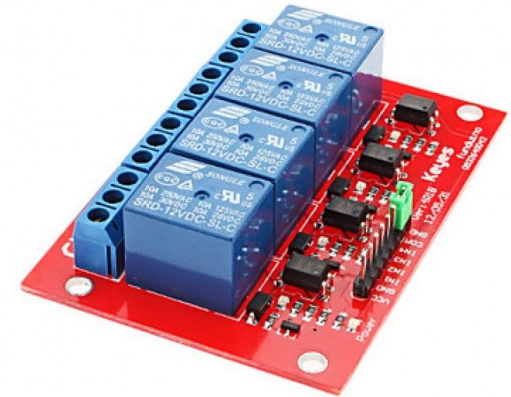
- Input voltage: DC 4.5~20V
- Static current: 50uA
- Output signal: 0,3V (Output high when motion detected)
- Sentry angle: 110 degree
- Sentry distance: max 7 m
- 120 degree detection angle
- Low power consumption in idle mode only 50uA and 65mA in fully active mode.

HC SR501 Pir Motion Sensor Module Pinout & Details



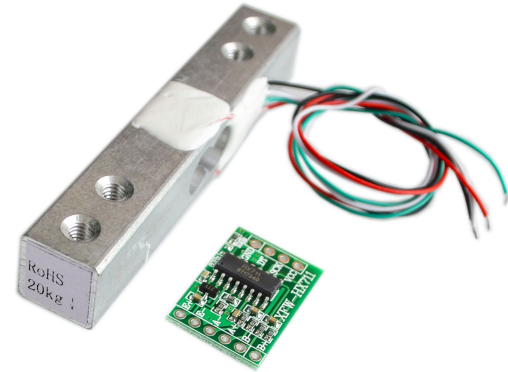
Relay Module (4 channel)

- High-sensitivity (250 mW) and High-capacity (16 A) versions
- Rated voltage 12 V DC
- Rated current 20.8 mA
- Coil resistance 576 Ω
- Must operate voltage 75% max. of the rated voltage
- Must release voltage 10% min. of the rated voltage
- Max. voltage 180% of rated voltage (at 23°C)
- Power consumption Approx. 250 mW

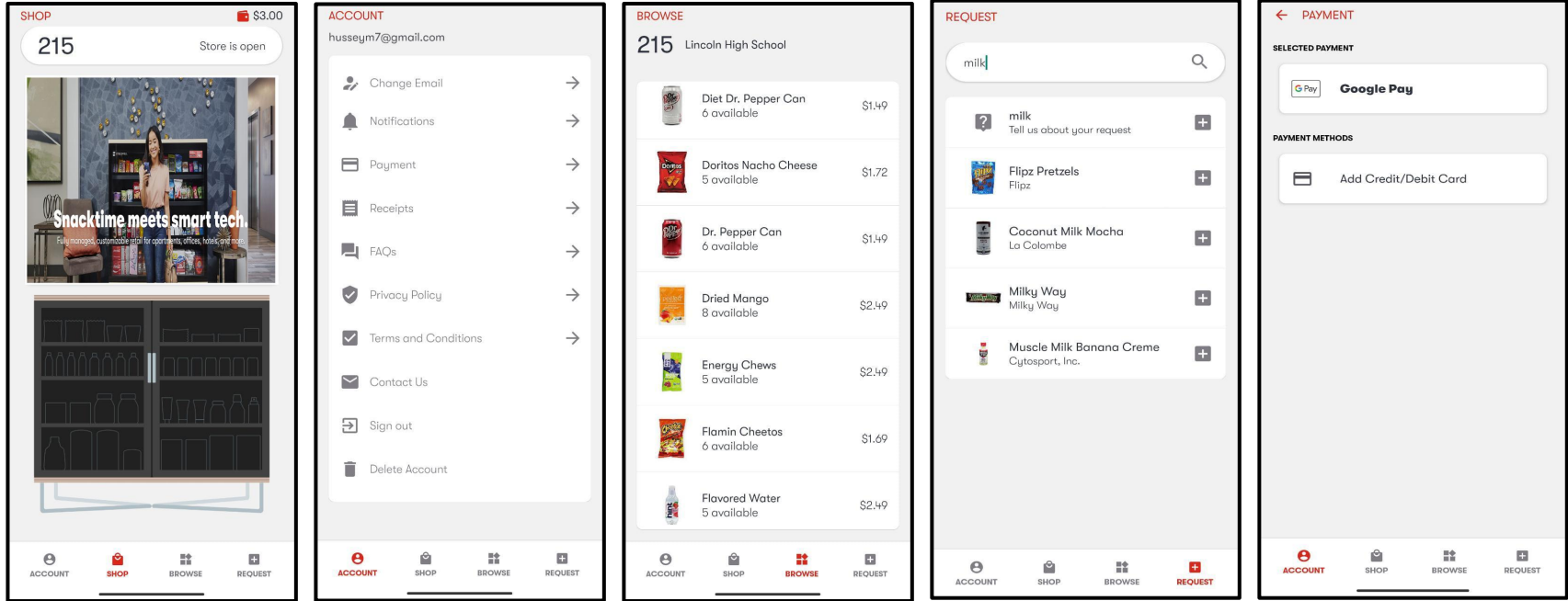


HX711 Weight Sensor

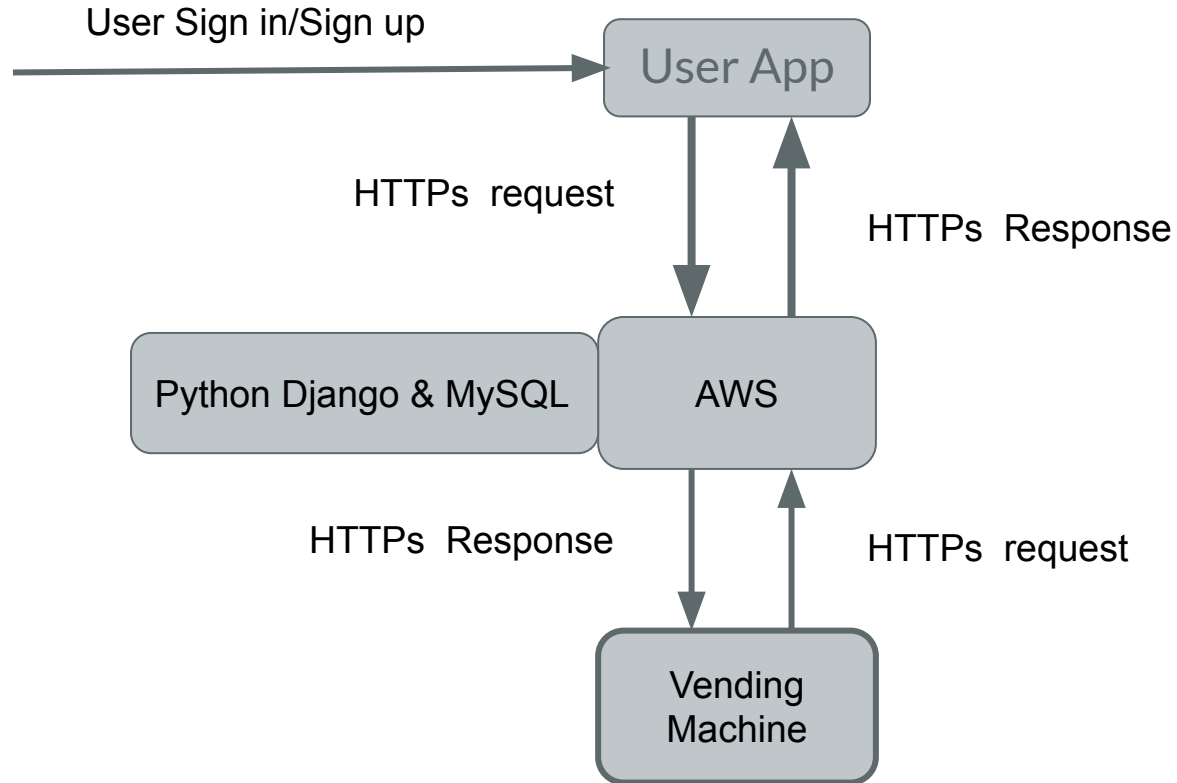
- Differential input voltage: $\pm 40\text{mV}$ (Full-scale differential input voltage is $\pm 40\text{mV}$)
- Data accuracy: 24 bit (24 bit A / D converter chip.)
- Refresh frequency: 10/80 Hz.
- Operating Voltage: 2.7V to 5V DC.
- Operating current: $< 10\text{ mA}$.
- Size: 24x16mm.



Graphical User Interface



Flow of data



Back End Tasks

- User Registration (User /Admin/Companies)
- Payment Handling
- Add /Modify/Delete Items
- Validation
- Transactions

Server

- Local server is made using **Python Django**
- The database is made in **mongoDB**
- Communication to AWS is done through HTTPS

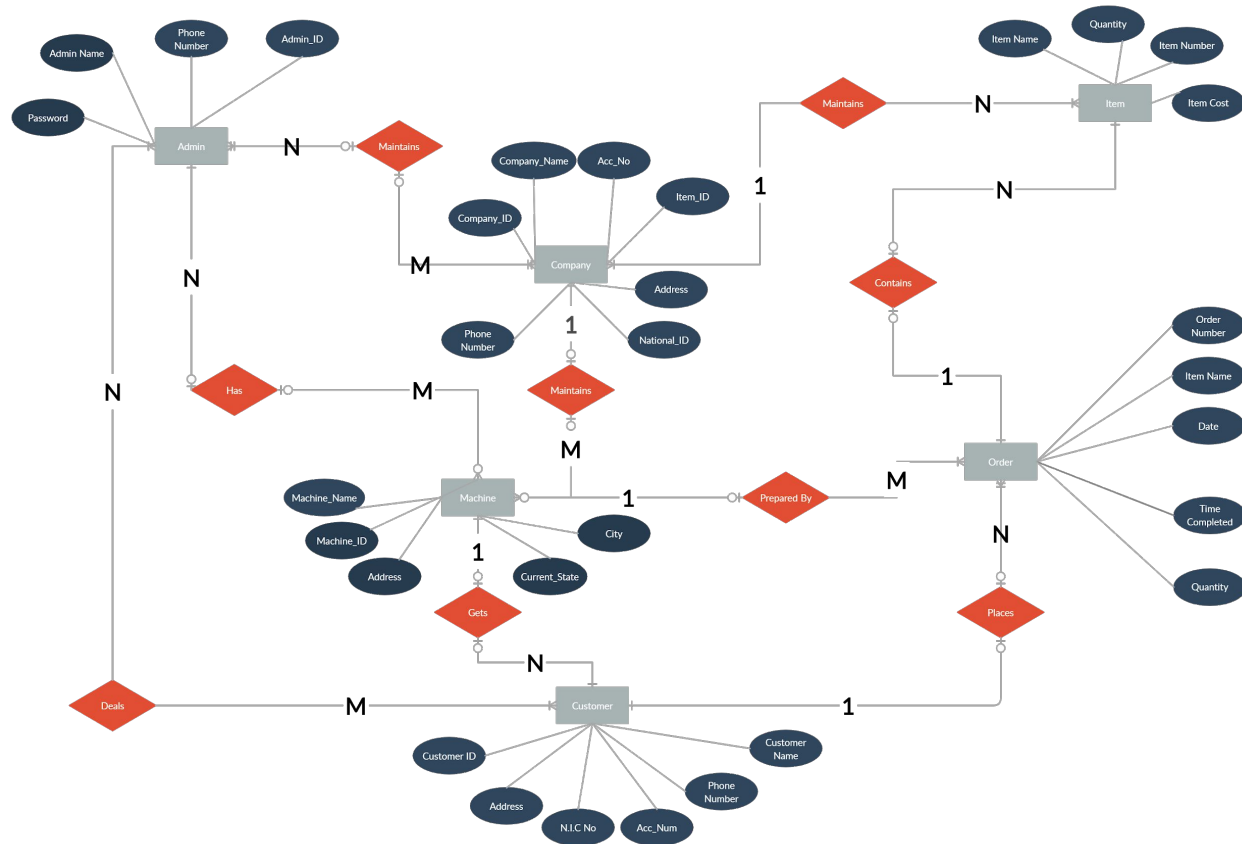


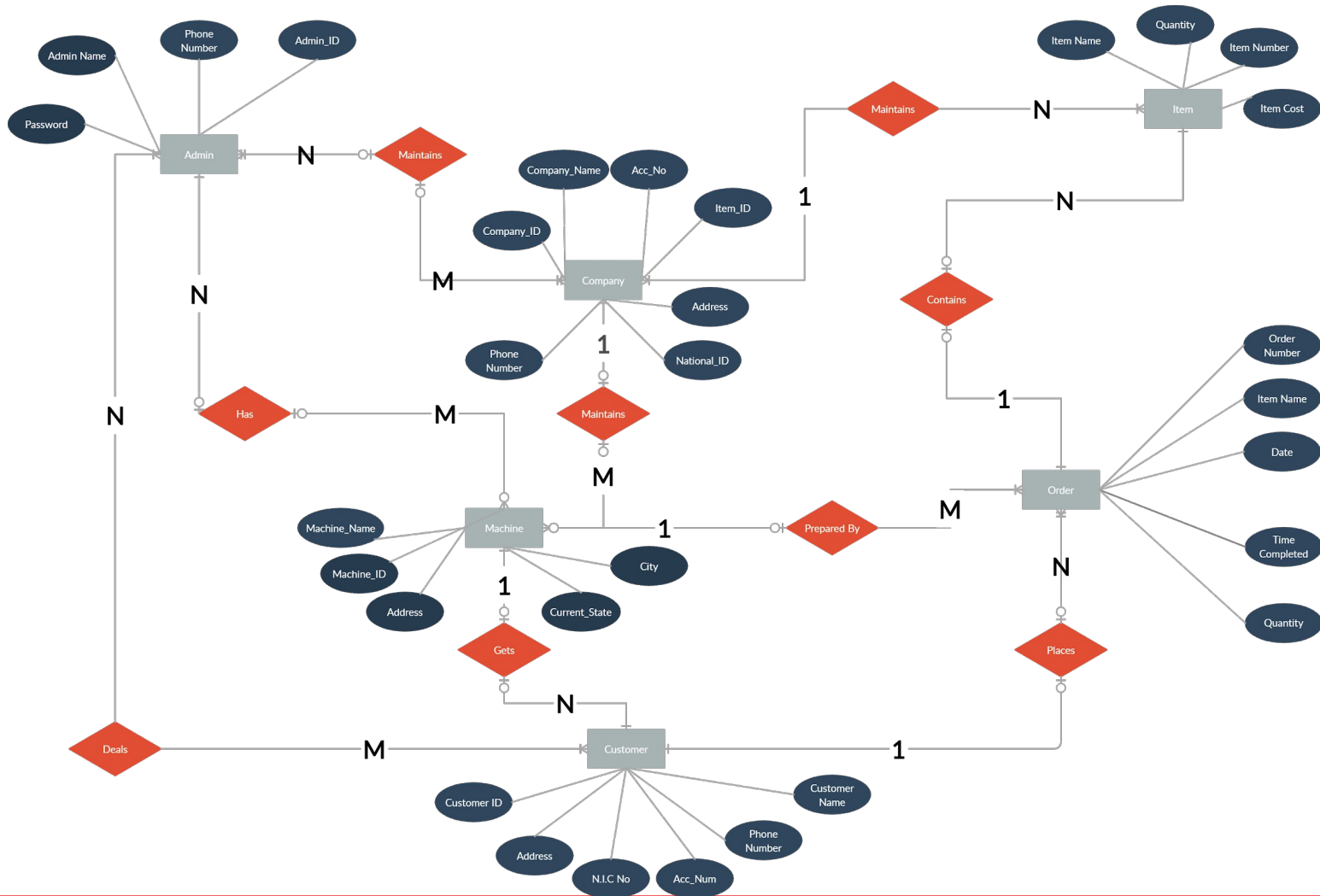
Cloud Server

- Host in amazon EC2 computer
- Built with Python Django
- Used database Mongo DB



ER Diagram





Budget

Raspberry Pi 3	1	7000	7000
Stepper Motor	2	1750	3500
Stepper motor driver	2	800	1600
Camera Module V2 for Raspberry Pi	1	1800	1800
Relay Module 12v 4 channel	1	450	450
HX711 Weight Sensor	1	650	650
HX711 Weight Sensor driver	1	190	190
PIR sensor	1	350	350
LED Strips	3	250	250
12V 2A DC Power Supply	1	300	300
Misc wire, 1ft 22-24 AWG	1	300	300
5.1 x2.2 mm DC panel mount jack-1	1	100	100
Fiber Glass	1	2000	2000
			18490

Timeline

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15
Researching and getting the idea of the project.															
Developing the Hardware parts fixing components															
Creating web page and adding the details of the items and vending machine details															
Creating a Web applications And Connecting it to the hardware															
testing the Product and fixing all the problems															

Q&A