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SMART TROLLEY

Guide

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Members

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INTRODUCTION

- It is an innovative solution designed to revolutionize the traditional shopping experience in retail stores and supermarkets

- Equipped with advanced technology to offer customers a seamless, convenient, and efficient shopping journey

- The trolley is equipped with sensors and cameras that allow it to autonomously follow the customer as they navigate the store

- Optimized billing and payment process

- Provides customers with real-time pricing information

OBJECTIVE

- To design a smart trolley that have an automatic human following and billing system.

- To reduce the need of manual checkout time and enhance convenience for customers.

LITERATURE REVIEW

BILLING TECHNIQUES

SI NO	REFERENCES	BILLING SYSTEMS	REMARKS
1	[1]	**RFID**	• No need of line of sight. • Read , write and modify
2	[2]	Barcode	•Line of sight is needed •Only read

MOTORS

SI NO	REFERENCES	MOTORS	REMARKS
1	[3]	Brushed DC motor	• rpm -3000 • Low cost
2	[4]	Stepper motor	• rpm -1000 •High cost
3	[1], [7]	**Geared DC motor**	• rpm -30 • Low cost

Dept. of ECE

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MOTOR DRIVER SHIELD

SI NO	REFERENCES	DRIVER SHIELD	REMARKS
1	[5]	L298N	• Used in high rpm motors • Heating
2	[6]	**L293D**	• Used in 500 rpm motors • Less heating

BATTERY

SI NO	REFERENCES	BATTERY	REMARKS
1	[7]	Lead Acid	• Charging time -8-16 hr • Very high toxicity
2	[8]	Ni-Cd	• Charging time -1-2hr • High toxicity
3	[2],	**Li-ion**	• Charging time-1-2 hr • Low toxicity

BLOCK DIAGRAM
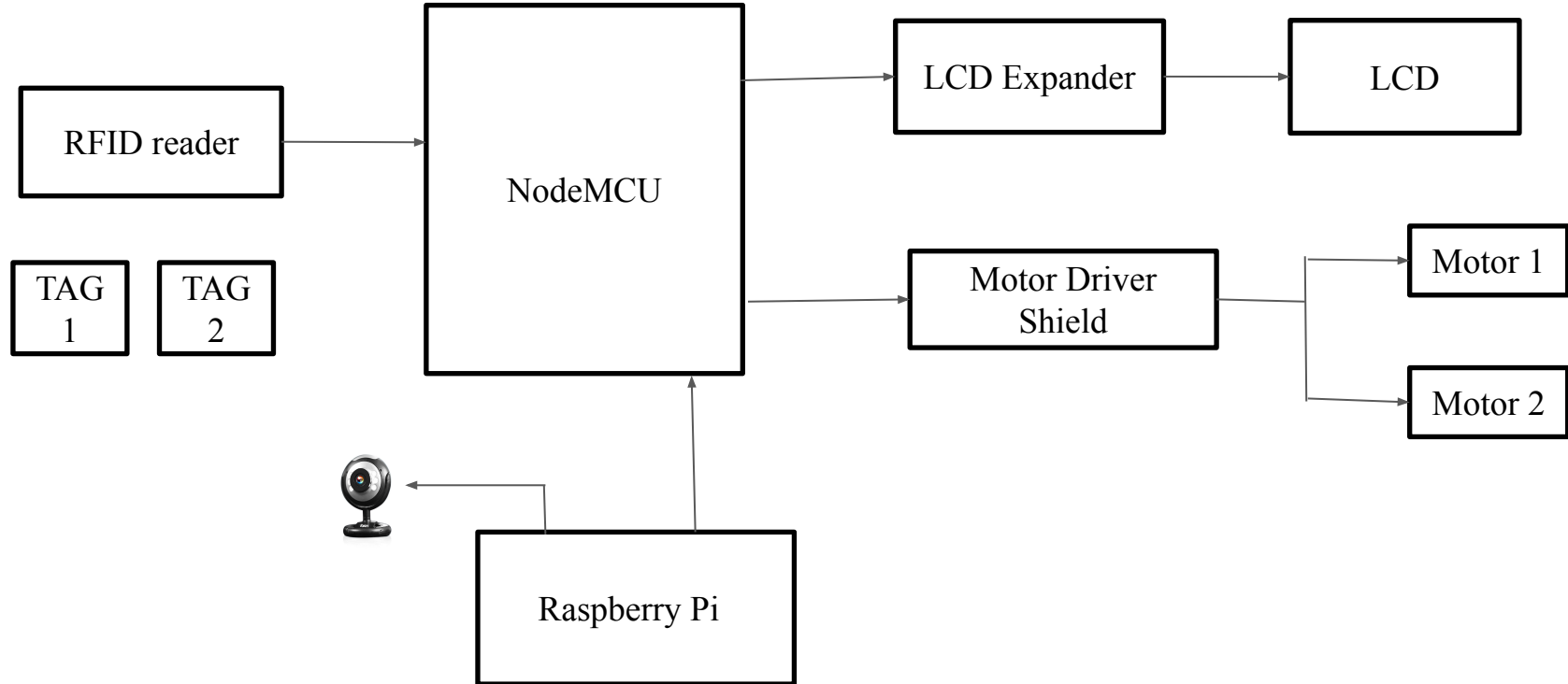
CIRCUIT DIAGRAM
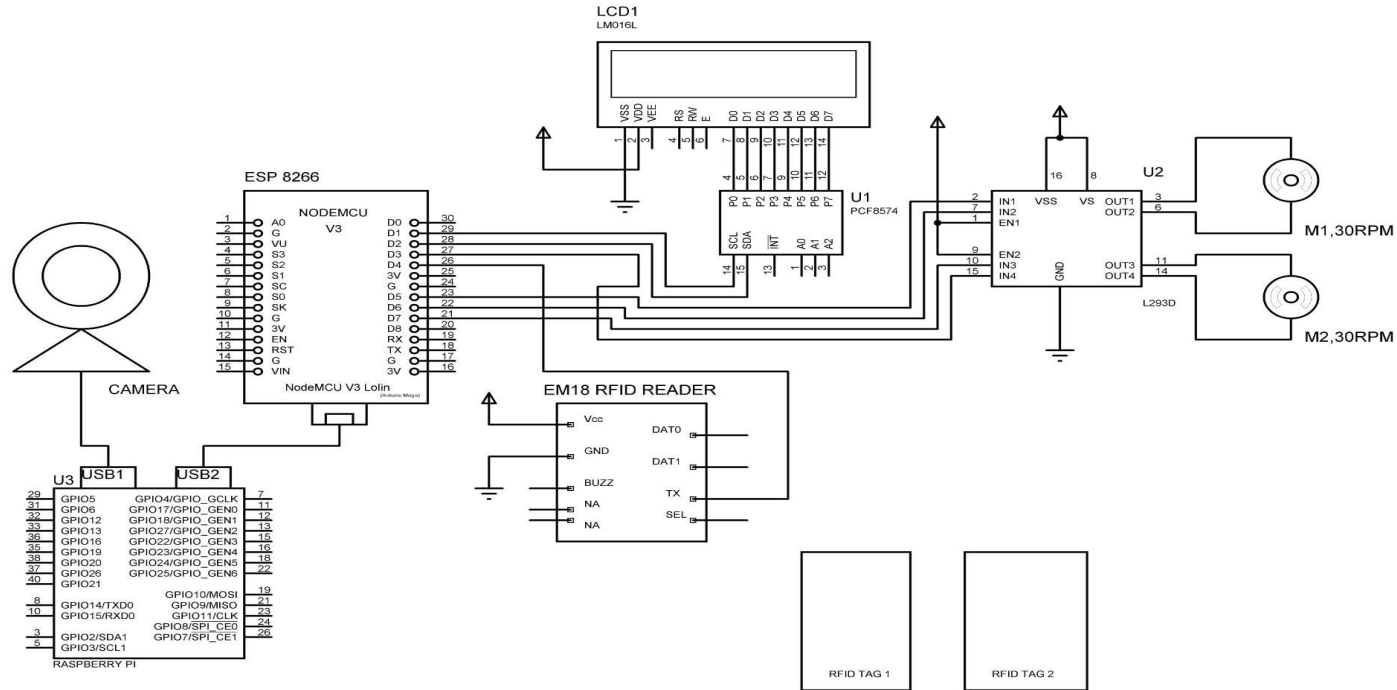
ALGORITHM

NodeMCU

- Step 1 : Initialization

    Initialize serial communication for RFID reader , and LCD display.

    Setup pins for motor control and turn of the motors initially.

- Step 2 : Product Scanning

    Check if data is available from RFID reader.

    If yes , read the RFID tag ID , compare the ID with predefined values and if the ID

    matches the predefined RFID tag , display the corresponding product information on

    LCD and set the price.

    Clear the LCD after a delay .

- Step 3 : Total Price Calculation

  Flags are used to keep track of whether a product has been detected once or twice.

  When a product is detected once (flag 1 or flag 2=1), add its price to the total and

  displays the updated total on LCD display .

  When a product is detected twice (flag 1 or flag 2=2), subtract its price from the total

  and displays the updated total on LCD display .

- Step 4 : Motor control

 Check if data is available from the serial port.

  If yes , read the incoming signal and control the motor movements accordingly based

  on commands " f " , " l " , " r " , " b", " s " .

Raspberry Pi

- Step 1 : Import required libraries and initialize serial communication with a device.

- Step 2 : Define object class (pattern) ,colours and load the object detection model.

- Step 3 : The code captures video from the webcam using OpenCV .

- Step 4 : Screen is divided into 3 columns using vertical lines and object detection is performed on a frame which is read from the webcam.

- Step 5 : If a pattern is detected , a bounding box is drawn around the object.
  The centroid of the bounding box is calculated and marked on the frame. Depending on the position of centroid, commands are sent through serial communication.

- Step 6 :If no pattern is detected,a stop command sent through serial communication.

- Step 7 :If the 'q' key is pressed, exit the loop .

CURRENTLY COMPLETED
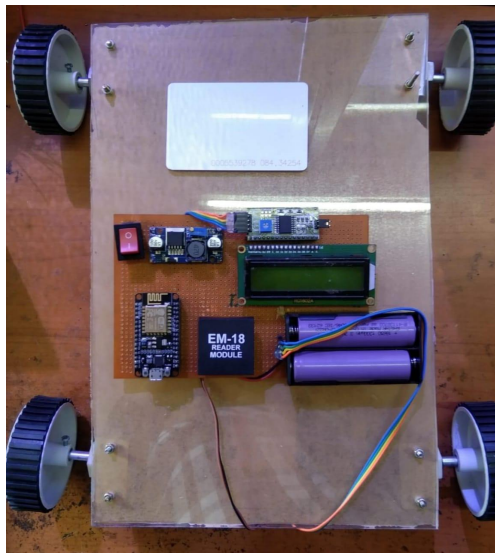
WORK PLAN

➡ completed

➡ Not completed

Work schedule	Feb 20 2024	Feb 26 2024	March 8 2024	March27 2024	April 1 2024
Literature review	➡				
Billing system		➡			
Hardware designing			➡		
Hardware implementation and checking				➡	
Image processing for human following					➡
Documentation					➡

<u>BIBLIOGRAPHY</u>

[1] Zeeshan Ali,Reena Sonkusare,'RFID based Smart Shopping: An Overview',2014 International Conference on Advances in Communication and Computing Technologies.

[2] Hanooja T,Raji C.G,Sreelekha M,Jemsheer Koniyath,Muhammed Ameen VK,Mohammed Noufal M,'Human Friendly Smart Trolley with Automatic Billing System',Fourth International Conference on Electronics, Communication and Aerospace Technology.

[3] Himani Pangasa,Shipra Aggarwal,'An Analysis of Li-Fi based Prevalent Automated Billing Systems in ShoppingMalls',Proceedings of the Third International Conference on Computing Methodologies and Communication

[4] A. Ismail, H. Ramli, M. Ahmad, and M. Marhaban, "Vision-based system for line following mobile robot," in Industrial Electronics Applications, 2009. ISIEA 2009. IEEE Symposium on, vol. 2, Oct 2009. pp. 642–645.

[5] Younes Sangsefidi, Saleh Ziaeinejad, and Ali Mehrizi-Sani,'A New Two-Motor Drive to Control a Two-Phase Induction Motor and a DC Motor'.

[6] Karunadasa JP,Nishan Withana,Kanchana Gallage,Janaka Wijayarathna,Asha Wijethilake,'Development of a Programmable Mechanical Motor Loading Unit using a DC Motor',Moratuwa Engineering Research Conference (MERCon) 2019.

[7] Ranjith Kumar, C. Bharatiraja, K Udayakumari, S Devakirubakaran, K Sathiya Sekar,'Advances in Batteries, Battery Modeling, Battery Management System, Battery Thermal Management, SOC, SOH, and Charge/Discharge Characteristics in EV Applications'.

[8] Aliakbar Akbari, Shiva Mirshahi, and Majid Hashemipour; Proceeding of the IEEE 28th Canadian Conference on Electrical and Computer Engineering Halifax, Canada, May 3-6, 2015

Thank You