



e-ISSN: 2278-8875  
p-ISSN: 2320-3765

# International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

Volume 10, Issue 6, June 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 7.282**

9940 572 462

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# Autonomous Delivery Robot with Face Recognition

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**ABSTRACT:**In today's Covid-19 pandemic situation maintaining of social distancing and contactless delivery is very difficult. So, the use of autonomous delivery robots is very helpful in this situation. The autonomous robot has an ability to follow the designated path with the help of a preloaded path. It reduces effort, time, error, etc and increases quality, efficiency and capacity in delivering the parcel. Use of face recognition system increases the security to transfer of documents using raspberry pi and raspberry pi camera. Alternatively, password based locker system are also available.

**KEYWORDS:**Arduino, OpenCV, Machine learning, Image processing.

## I. INTRODUCTION

As the title says, our project is about an autonomous delivery system, not yet intelligent enough to deliver stuff across cities, but one which 'should' at least be able to deliver small objects from one place to another in your college or house. The main idea of the autonomous delivery system is to have a robot which can transport physical objects from one place to the other. There are many potentials uses for such a system; in general, it would be detecting when something has arrived, and taking it where it is needed autonomously. Some specific applications we could think of are these:

- Transporting something as a letter or small parcel from one place in your college (let's say from a letter box) to you in the college.
- In a workplace or office, with many people working together and the need to transport physical documents from one station to the other.
- In an environment such as a hospital where samples need to be transported.

The autonomous delivery system should be able to work for the above scenario with a few minor changes. But for this documentation, we will choose the first application specified, that is transporting something small such as a letter or small parcel (We assume it's a letter from now on) from one place in your college (from example from a letter box - to be called the origin from now on) to you in your college. This autonomous delivery system will be designed using Arduino and Raspberry Pi Platform, with a custom part. For doing this, the Robot needs to be able to do the following:

- At first, the Robot should be waiting at the origin
- It should detect (using a sensor) when a letter is placed in a container (on the Robot).
- Once detected, it should start moving on a specified track.
- Once you notice the letter and pick it up from the container on the Robot, the sensor should detect that there is nothing to deliver at the moment and return back to origin.

## II. WORKING

The block diagram of Autonomous Delivery Robot is for delivering files, parcels, items etc in the office by using Arduino and Raspberry pi is used for face recognition. Robot having two wheels and one freewheel is mounted along with different sensors and modules i.e., ultrasonic sensor, motor driver. This robot is controlled by a predefined path as it follows a path by unique identification of the cabin. For that we have connected the keypad to the input of the Arduino. Depending upon the programming case we choose using keypad we assign the particular directions and path for the cabin. We can give input manually to the robot through the keypad. The number of cases is equal to the number of the cabin present in the Department. We use an LCD display to display whether the key is pressed or not. Ultrasonic



sensor used to detect the obstacles in the path. It transmits the signal continuously if any obstacle comes then the transmitted signal gets disturb and the reflected signal known as echo which is received by the ultrasonic receiver. If the obstacle is detected between 5cm to 20cm robot will stop else it will follow the given path & the distance is calculated by using Eq. (1) & (2)

$$\text{Distance} = 17150 * \text{Time} \dots\dots (1)$$

$$\text{Distance} = \text{Pulse Duration} * 17150 \dots\dots (2)$$

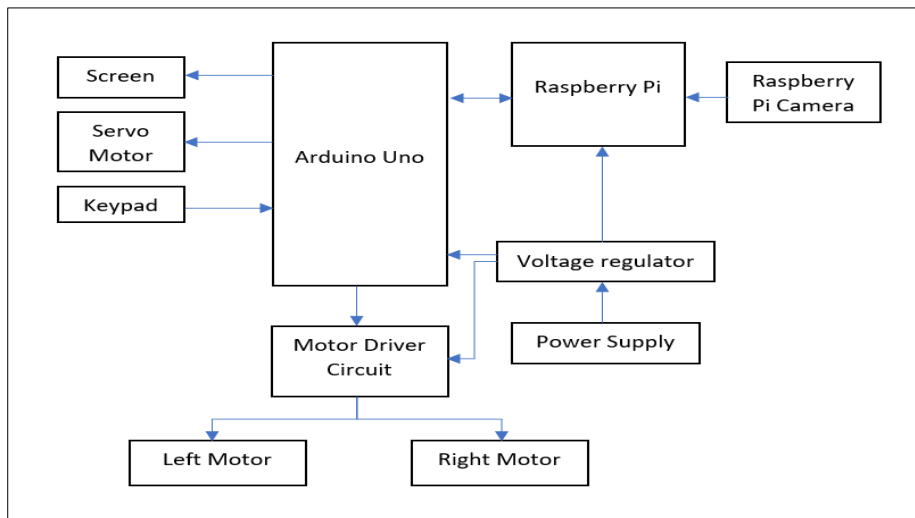


Fig. 1 Block diagram of Autonomous delivery robot with face recognition

The storage basket of this robot is fully secured with a lock. We installed two parallel unlocking method in this project, first one is Face Recognition System in that when robot reached to its destination user need to enter particular way to unlock basket if he/she choose face recognition then Arduino will send the pulse to raspberry pi to wake-up from sleep mode and the camera module will start and capture image and compare with preloaded image in raspberry pi. If match found correct the unlock the system. If match not found robot will wait for some time and it will return to the source destination. Also, in that second one is the Password System in that if a user selects a password system, then the user needs to enter a special password for them then and then will be basket lock unlocked and user able to take the package out. We define a special keyword to each faculty which they need to enter during unlocking the basket.

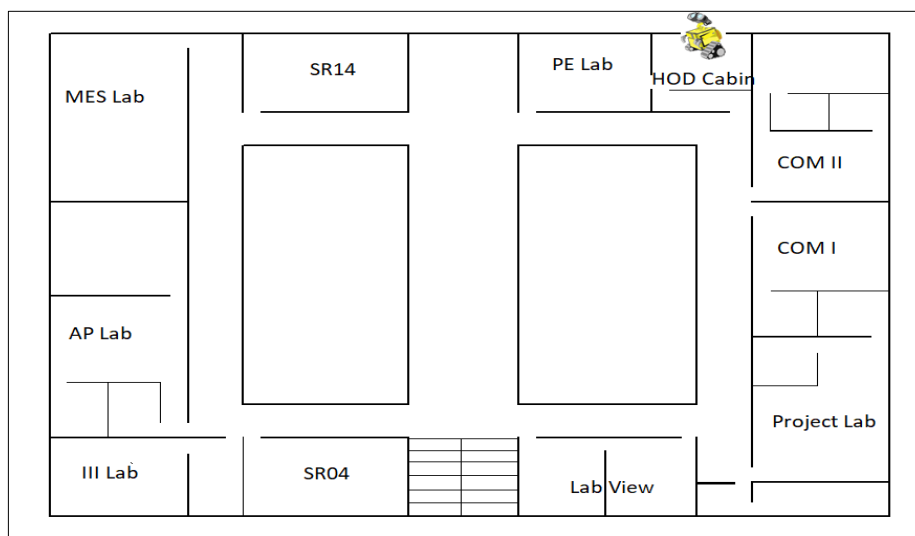


Fig. 2 Department Layout



### III.COMONENT

**Arduino:** For the rowing mechanism we use the Arduino Uno which is the brain of a robot.It is an open-source microcontroller board based on the ATmega328p microcontroller. It has 14 digital pins, 6 analog input pins, on-board voltage regulator etc. Arduino Uno has 32KB of flash memory, 2KB of SRAM and 1KB of EEPROM. It operates at a clock frequency of 16MHz. Arduino Uno supports Serial, I2C, SPI communication for communicating with other devices.

**Motor Driver:** It is a dual bidirectional motor driver,based on the very popular L298 Dual H-Bridge Motor Driver Integrated Circuit. The circuit will allow you to easily and independently control two motors of up to 2A each in both directions.

**Raspberry pi:** Raspberry Pi 3 is a 64-bit quad core processor running at 1.4GHz, dual-band 2.4 GHz and 5 GHz wireless LAN, Bluetooth 4.2/BLE, 40-pin extended GPIO, faster Ethernet and PoE capability via a separate PoE HAT. For the face recognition system we used a raspberry pi with a raspberry pi camera module which is connected to the CSI (Camera Serial Interface) port of the Pi.

There are other components also be used like keypad, motor wheels, dc motors, battery, lcd screen etc.

### IV. RESULT AND DISCUSSION

In the fig 3, it shows the prototype work of an autonomous delivery robot.

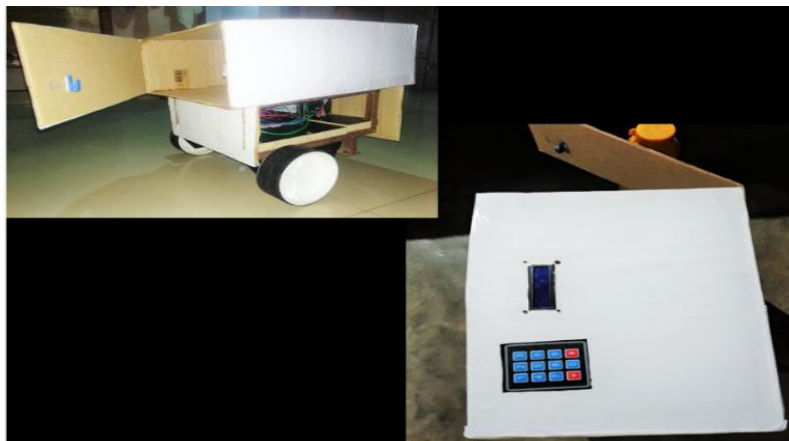


Fig. 3Robot Prototype



Fig. 4Face Detection



## V.CONCLUSION

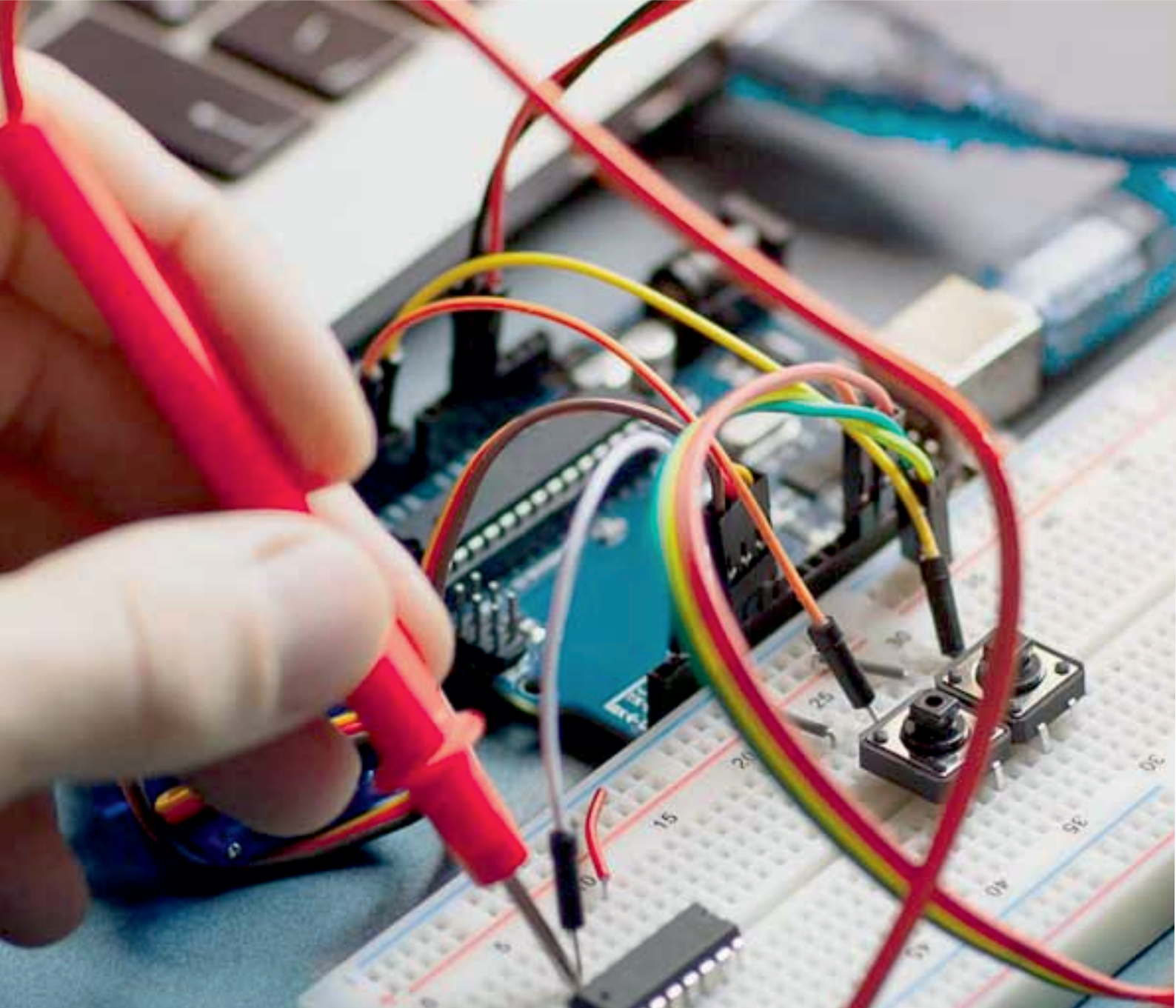
A secured autonomous delivery robot is able to deliver parcels (files, documents, etc.) from one destination to another destination by using a preloaded path. In this project we used a face recognition system to secure transfer of documents by using raspberry pi and raspberry pi camera. Also, to unlock storage digital password lock is available.

## VI.FUTURE SCOPE

Autonomous delivery robots are robots that work autonomously and are mainly utilized for delivery and service applications. Their application and adoption in the healthcare, Hospitality, retail and logistics industries are only considered while evaluating the scope of the end- user segment. The study will also cover the impact of COVID-19 across the autonomous delivery robot market.

## REFERENCES

- [1] Akshay A. Mane, M. N. (2015). Robotics Based Simultaneous Localization and Mapping of an Unknown Environment using Kalman Filtering. International Conference on Engineering (NUiCONE).
- [2] Sandeep Bhat, M. M. (2015). Embedded System based waiter and military robot path planning. International Conference on Control, Instrumentation, Communication and Computational Technologies (ICCICCT).
- [3] J.S.Tan, V.Teh, H.M.Teck, Z.H.Lim, C.Manoharen (2016). Future farming robotic delivery system Jackbot Mark 1. IEEE Conference on Wireless Sensors (ICWiSe).
- [4] YongChai Tan, B. L. (2010). A New Automated Food Delivery System Using Autonomous Track Guided Centre-Wheel Drive Robot. IEEE Conference on Sustainable Utilization and Development in Engineering and Technology.
- [5] Md. Kamruzzaman, M. T. (2017). Design and implementation of a robotic technique based waiter. International Conference on Electrical Information and Communication Technology (EICT).
- [6] Jennings, D., Figliozzi, M., 2020. A study of road autonomous delivery robots and their potential impacts on freight efficiency and travel. Transp. Res. Rec. (forthcoming).
- [7] Fatima R.Ali, A. R. (2018). Design and implementation of static and dynamic objects store systems using line follower robots. International Conference on Advances in Sustainable Engineering and Applications (ICASEA), Wasit University, Kut, Iraq.
- [8] Sayali N Joshi, V. K. (2019). Design and Development of Human Following Trolley. International Journal of Innovative Science and Research Technology ISSN No: -2456-2165, Volume 4 (Issue 4).



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