

# **Mini Project Report**

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## **WAREHOUSE AUTOMATION**

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Last but not the least, we wish to thank our parents for financing our studies in this college as well as for constantly encouraging us to learn engineering.

# OVERVIEW

A warehouse refers to a large building where raw materials or manufactured goods may be stored prior to their distribution for sale. It is of utter importance to have a stable and properly functioning warehouse to support the flow and productivity of an organization responsible for manufacturing products.

The product needs to be stored and then distributed in an efficient manner. Warehouse is widely touted as one of the most effective ways to boost ROI by reducing labour demands, enhancing accuracy, and improving efficiency. Warehouse automation is one of the last areas where long-term costs can be significantly reduced. In reality, complete warehouse automation entails automating a variety of aspects of operations, from automatic data capture to software systems, storage and retrieval, and more.

In our project we have developed an autonomous robot that takes input (desired object) from the user through a wirelessly connected device and then fetches the desired object(product) and then deliver it to the desired area.

## **GOALS**

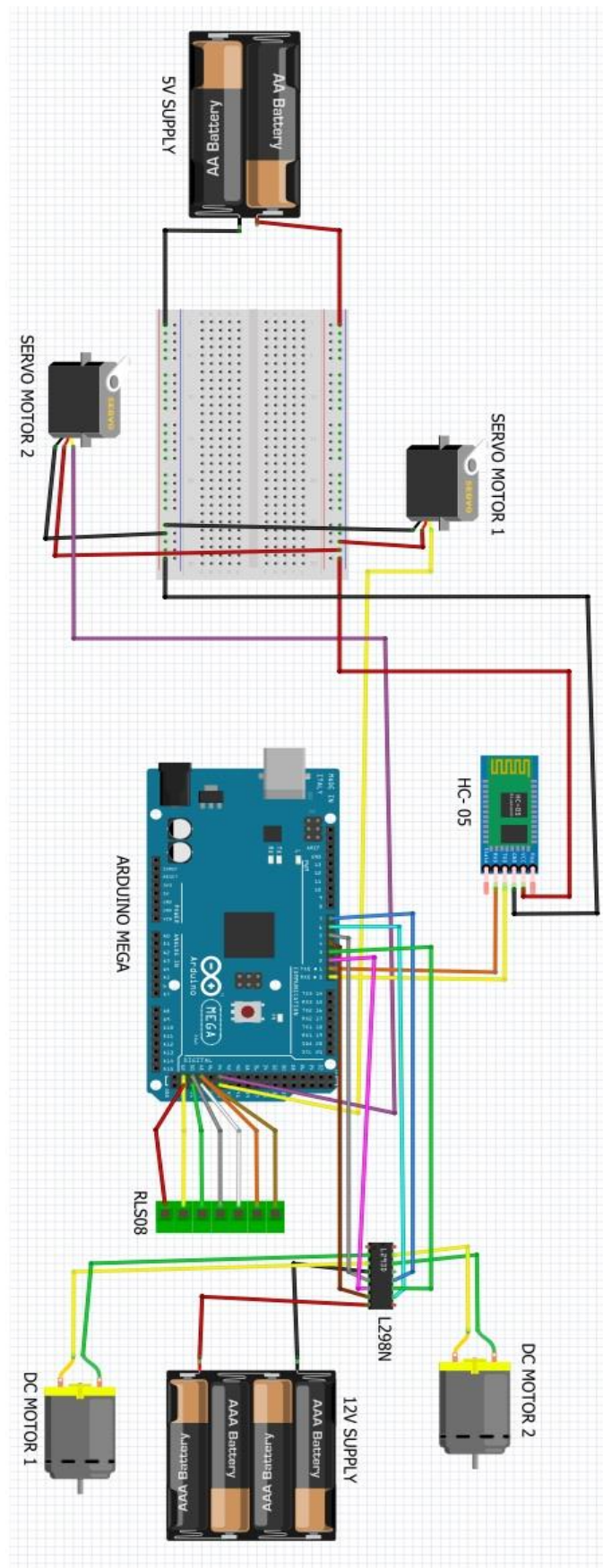
1. To automate entire warehouse inventory.
2. To make sorting and delivery of goods efficient.

# **SPECIFICATIONS**

We have developed a prototype of an autonomous robot that

- I. Takes input, that is the desired coloured box to be picked, through a mobile phone via Bluetooth communication.
- II. Then it scans the entire arena(warehouse) with the help of tracks made on the ground that is, the robot scans the arena while line following with the help of an array of IR sensors and DC motors.
- III. The robot scans the arena with the help of an RGB sensor mounted on its arm.
- IV. When the robot finds the desired product, it picks that product with the arm which is driven by servo motors.
- V. It then moves straight towards the destination unload the product.

# SCHEMATICS



# COMPONENTS

- A. Arduino Mega
- B. RLS08
- C. L298 motor driver
- D. 12v DC motors
- E. MG995 Metal Gear Servo
- F. HC05
- G. TCS3200

## A. Arduino Mega

- The Arduino Mega 2560 is a microcontroller board based on the ATmega2560.
- It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs)
- A 16 MHz crystal oscillator
- A USB connection
- A reset button

## B. RLS08

- Consists of 8 array TCRT5000 IR transmitter and IR receiver pairs.
- RLS08 have 5 analog and digital outputs. The user can use both analog and/or digital signal.

## C. L298 motor driver

- Operating supply voltage up to 46 v
- Total dc current up to 4 a
- Low saturation voltage
- Overtemperature protection
- Logical "0" input voltage up to 1.5 v (high noise immunity)



#### **D. 12v DC motors**

- RPM: 300.
- Operating Voltage: 12V DC
- Gearbox: Attached Plastic (spur)Gearbox
- Shaft diameter: 6mm with internal hole
- Torque: 2 kg-cm
- No-load current = 60 mA (Max)
- Load current = 300 mA (Max)

#### **E. MG995 Metal Gear Servo**

- Operating Voltage - 4.8 – 7.2 V
- Stall Torque - 10 kg-cm
- Gear Type - Metal
- Rotational Degree - 180 degrees

#### **F. HC-05**

- Typical -80dBm sensitivity
- Up to +4dBm RF transmit power
- Low Power 1.8V Operation ,1.8 to 3.6V I/O
- With integrated antenna
- With edge connector

#### **G. TCS3200**

- High-Resolution Conversion of Light Intensity to Frequency
- Programmable Colour and Full-Scale Output Frequency
- Communicates Directly with a Microcontroller
- Single-Supply Operation (2.7 V to 5.5 V)

## **OTHER COMPONENTS**

- Acrylic sheet
- Hinges
- Oblique U shape brackets
- Ball bearing castor wheel
- Nuts and Bolts

## **CONCLUSION**

At its core, automation revolves around identifying repetitive tasks that are process-oriented, time-consuming, or error-prone, and finding ways to automate them. And as anyone in the warehousing industry is well aware, warehouses are rife with repeatable, process-oriented, and error-prone tasks, ranging from manual documentation errors to picking and stocking errors, shipping and receiving errors, and much more. For this reason, there are many aspects of warehouse operations that can be automated.