



**INVENTORY
SYSTEM**

Students

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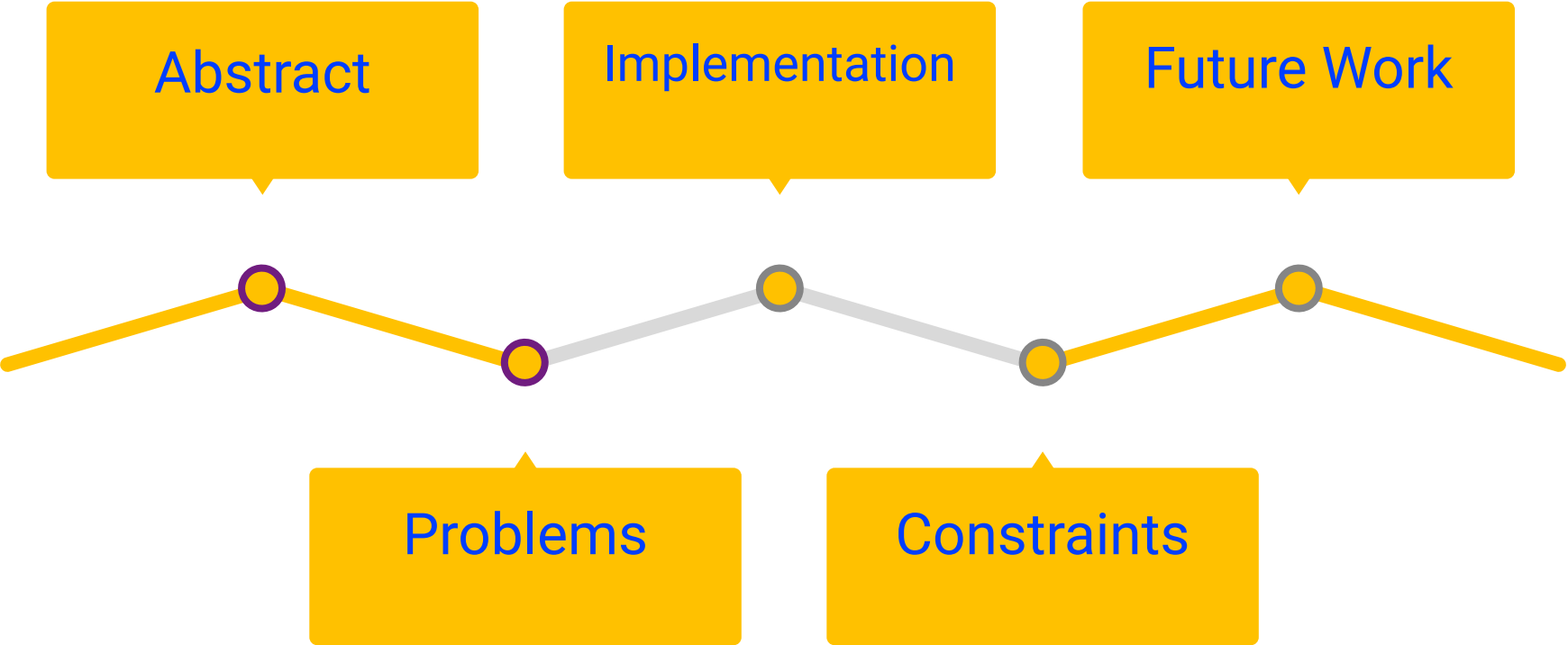
Instructors

Anas Toma



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Outline

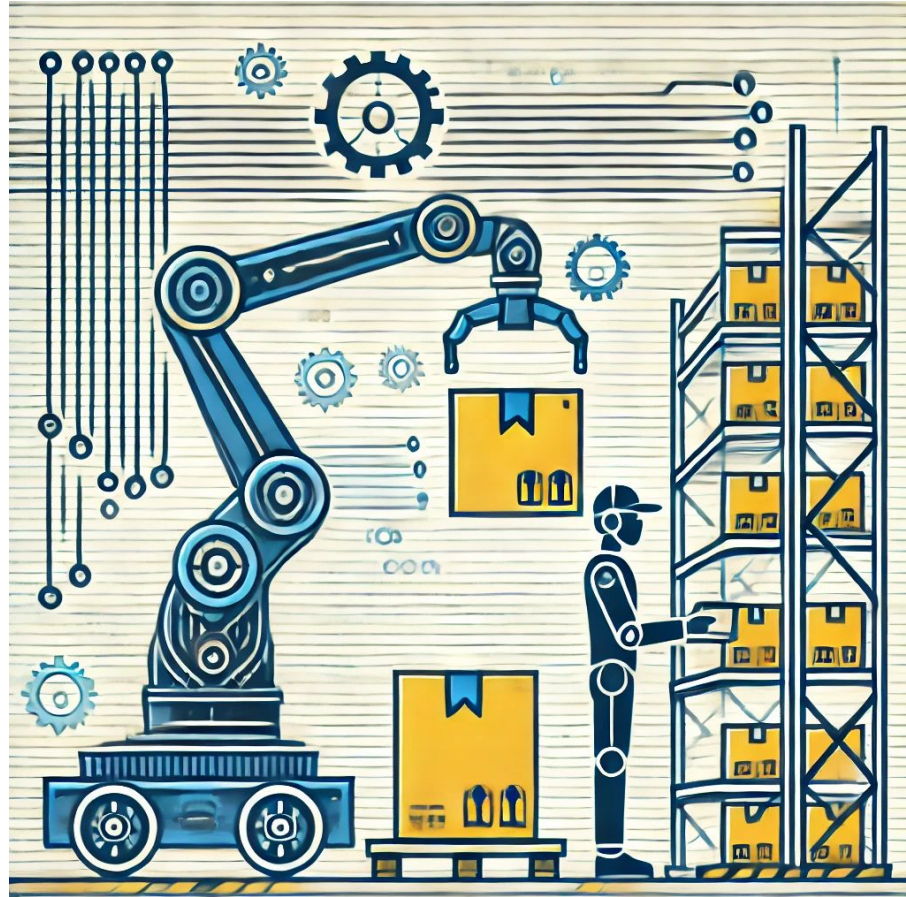


Abstract

Our project presents an integrated inventory system that automates the arrangement and storage of packages in warehouses and manages student deposits at An-Najah National University. The system uses a robotic arm and a user-friendly interface to enhance efficiency by reducing errors and delays in package and deposit handling.



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The Problem



Manual handling in traditional inventory systems causes high error rates and delays. Scaling up operations adds challenges, with conventional systems struggling to maintain accuracy and efficiency. These issues highlight the need for advanced, automated solutions.



Manual Inventory Errors



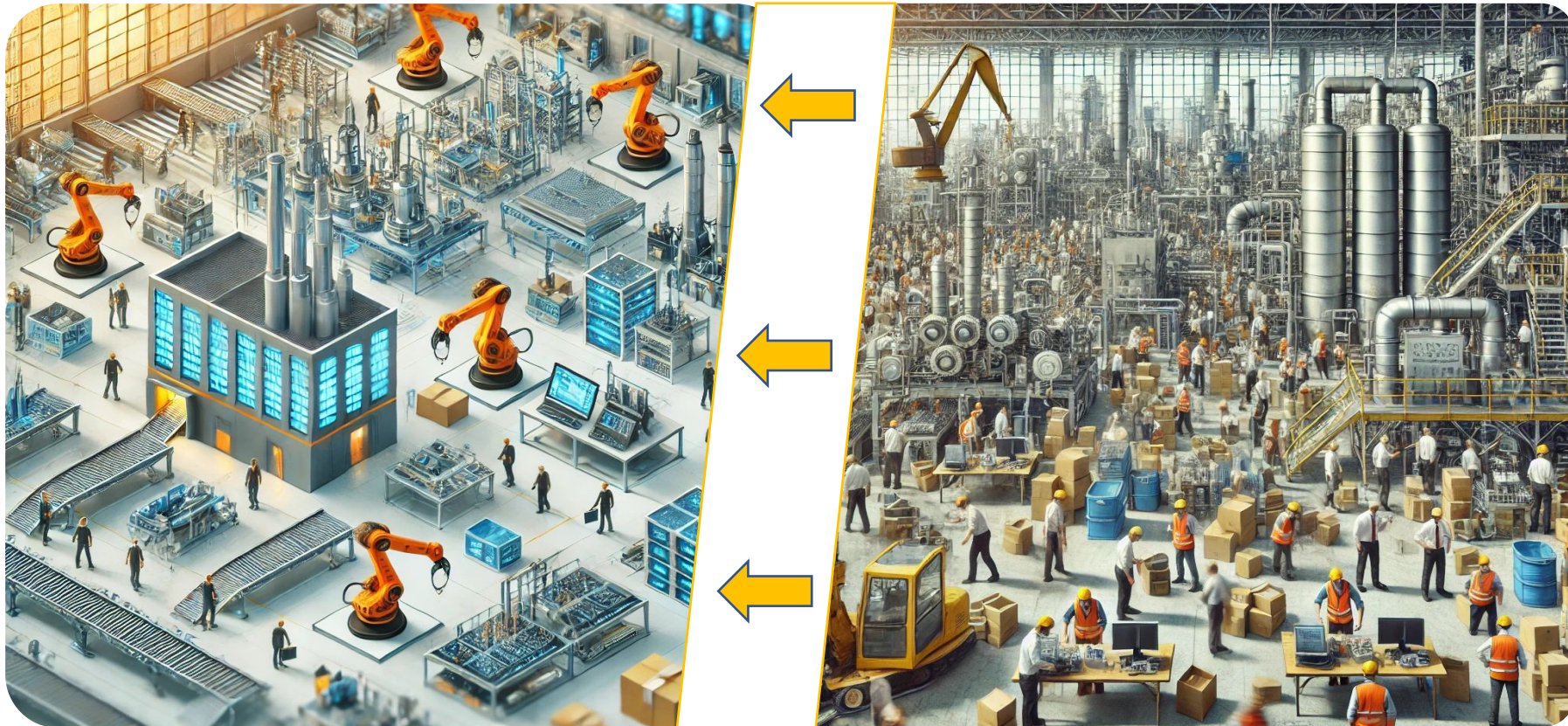
Scalability Issues



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About Inventory System

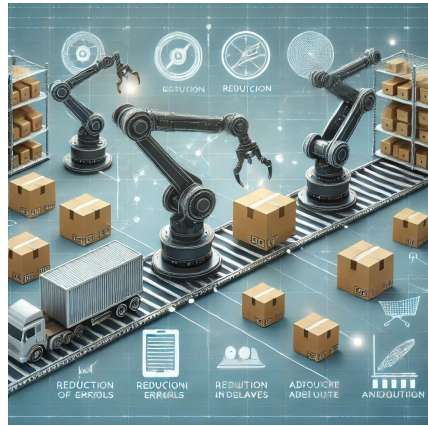
Our solution is an advanced inventory system that tackles manual handling and scalability challenges. Leveraging automation and user-friendly interfaces, it enhances efficiency and accuracy in inventory management.



Objectives

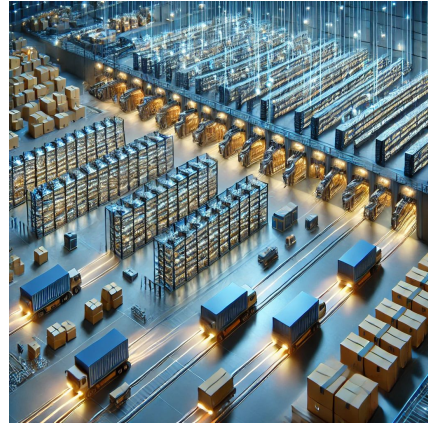


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Reduce Errors and Delays

Implement automation to minimize human errors and speed up inventory processes.



Enhance Scalability

Develop a system that efficiently manages large volumes of inventory with high accuracy.



Improve Efficiency

Streamline sorting, storing, and retrieving items to boost overall productivity.



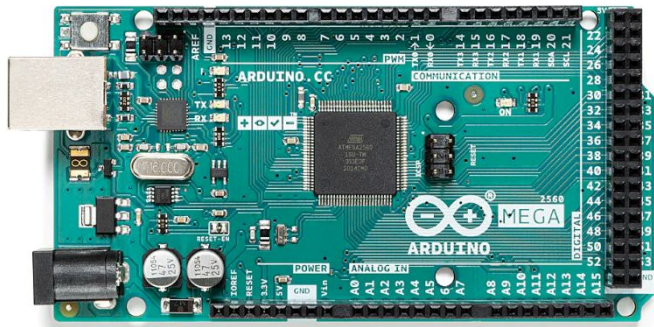
Provide Real-Time Tracking

Enable instant access to inventory status and locations through a user-friendly interface.

Hardware Components

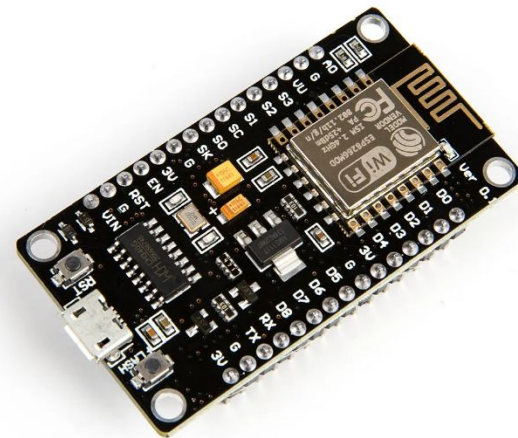


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Arduino Mega

Main System Controller



Esp8266

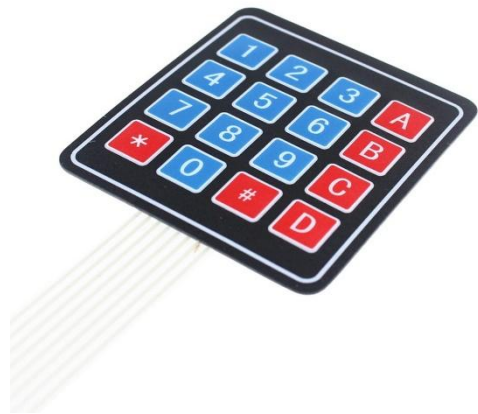
**WIFI And Mobile
Application**



Barcodes reader SH-400

read printed barcodes

Hardware Components



Keypad

Setting the Product



Limiting Switches

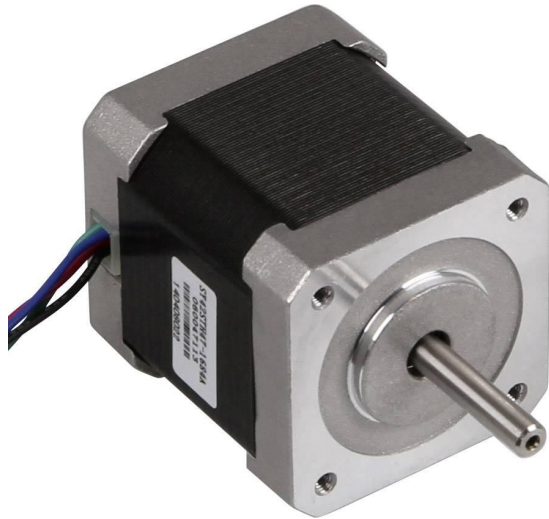
Movement Limits



Power Supply

Powering The System

Hardware Components



Nema 17

Gripper Movements



HY DIV268N

Driving Motors



DC motor

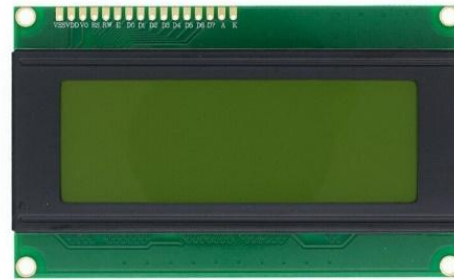
Mechanical Motion

Hardware Components



IR sensor

sense the product



Lcd

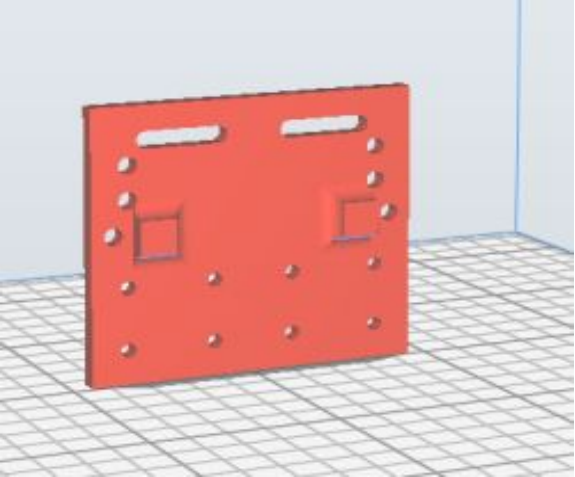
Displays System Status



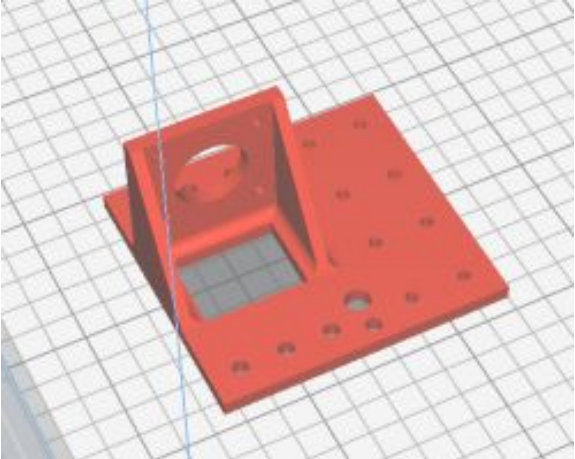
Breadboard

building and prototyping

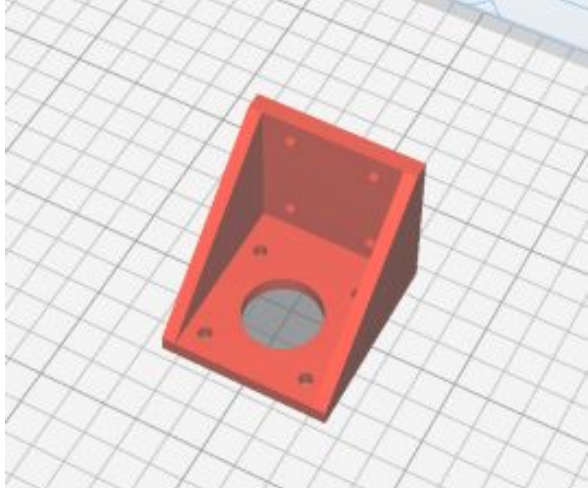
Custom 3D Printed Parts



bottom y axis holder

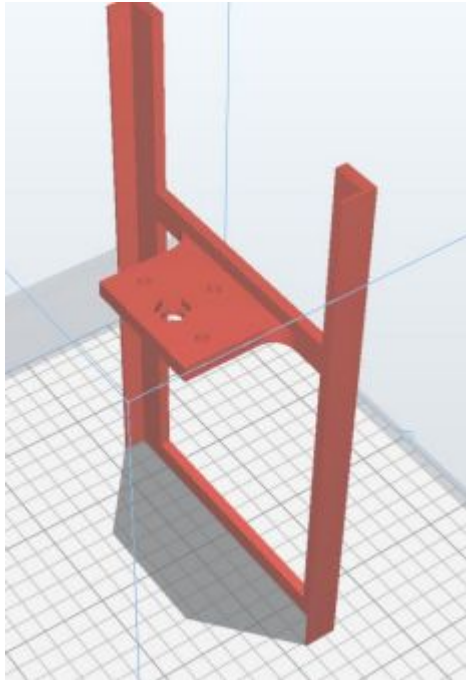


top y axis holder

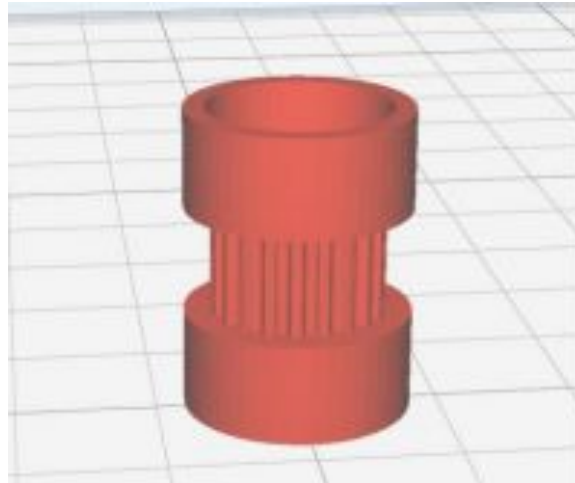


nema17 holder

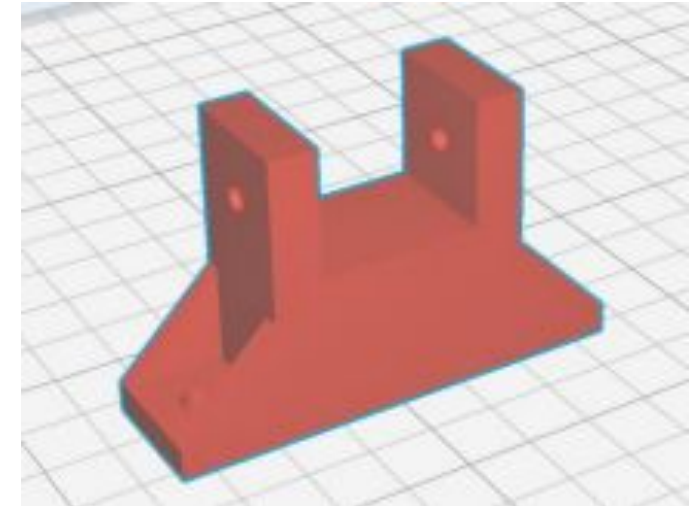
Custom 3D Printed Parts



moving arm part



GT2 Timing Pulley

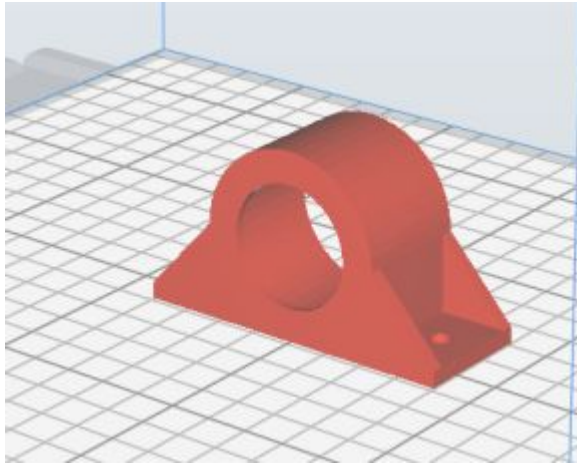


**timing pulley holder
h35mm**

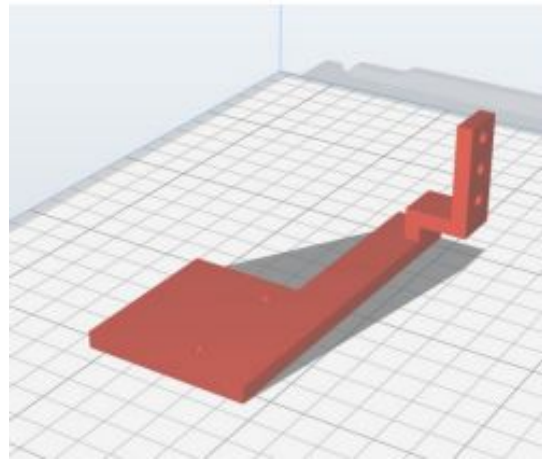
Custom 3D Printed Parts



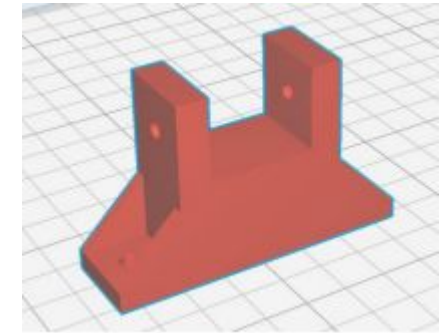
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dc motor holder



15 barcode reader holder

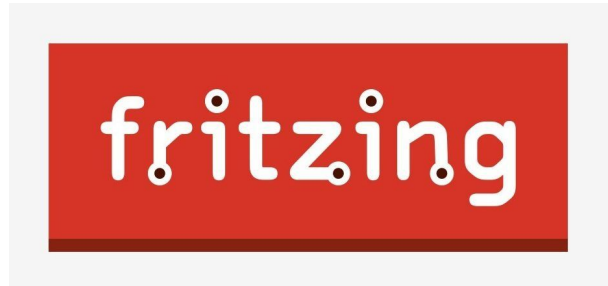


box plate holder

Software



Arduino IDE
write code



Fritzing
electronics design



Flutter
Develop Mobile App

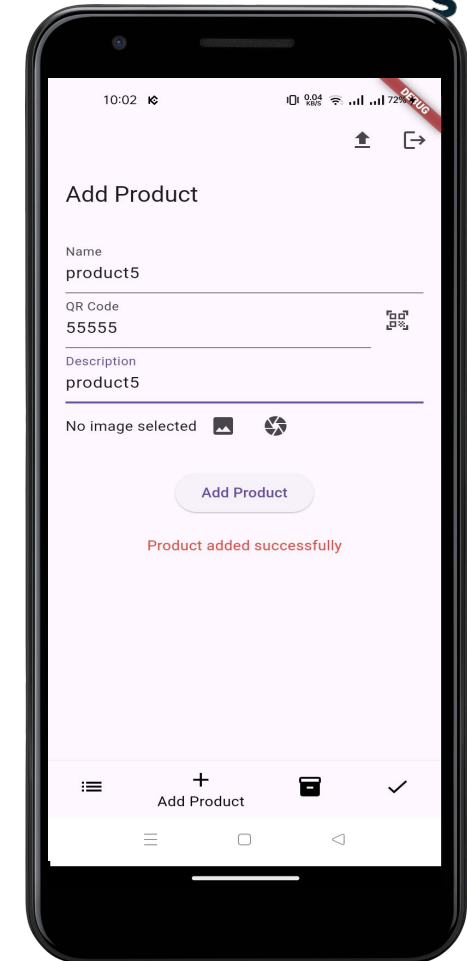
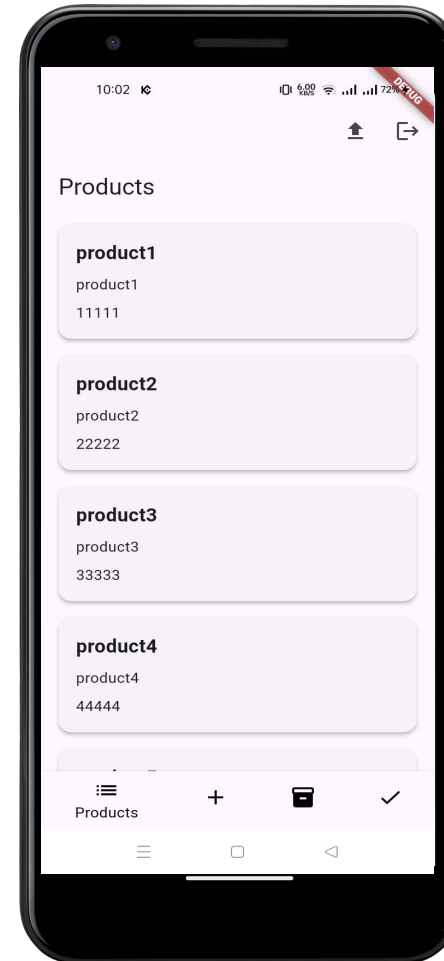
Mobile App

Product display interface

After the user adds the product, scans it, and adds the rest of the information, this page provides comprehensive information about the products available in the store and displays the available products as a catalogue.



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Mobile App

Allowed products interface

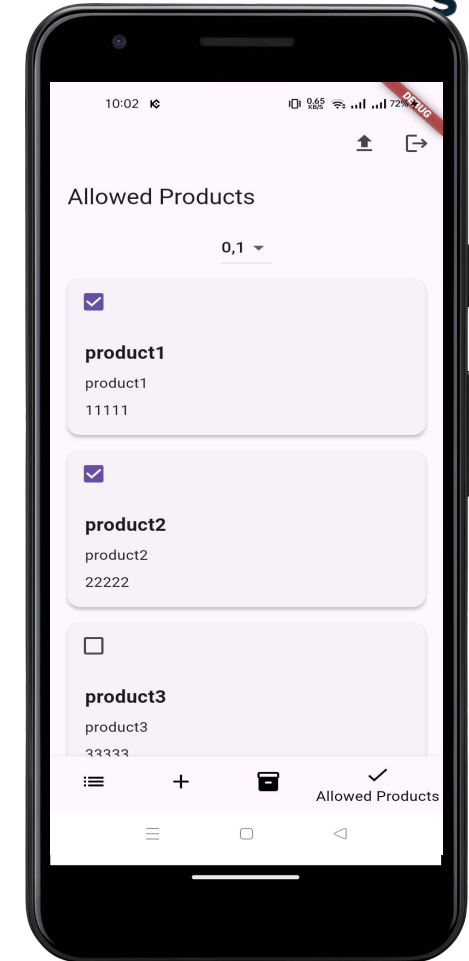
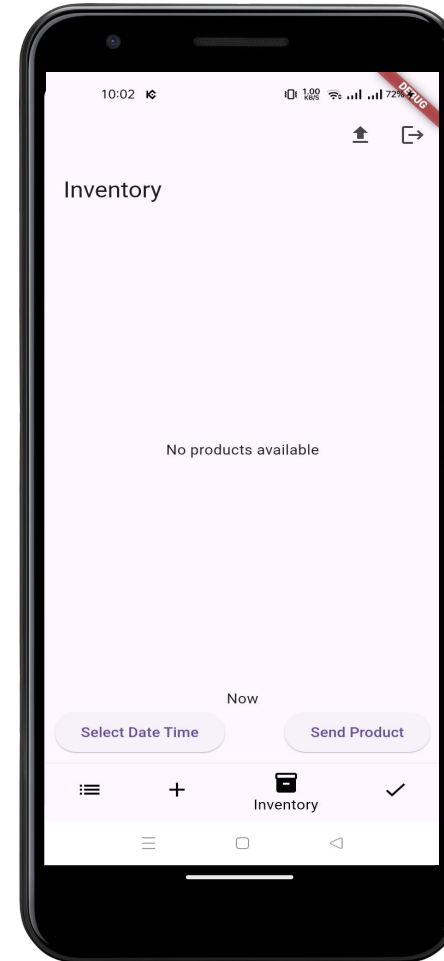
For selecting what product can be stored in a specific cell

inventory interface

An interface that displays the products present on the store shelf with the ability to click on the product and send it to the output at a specific time



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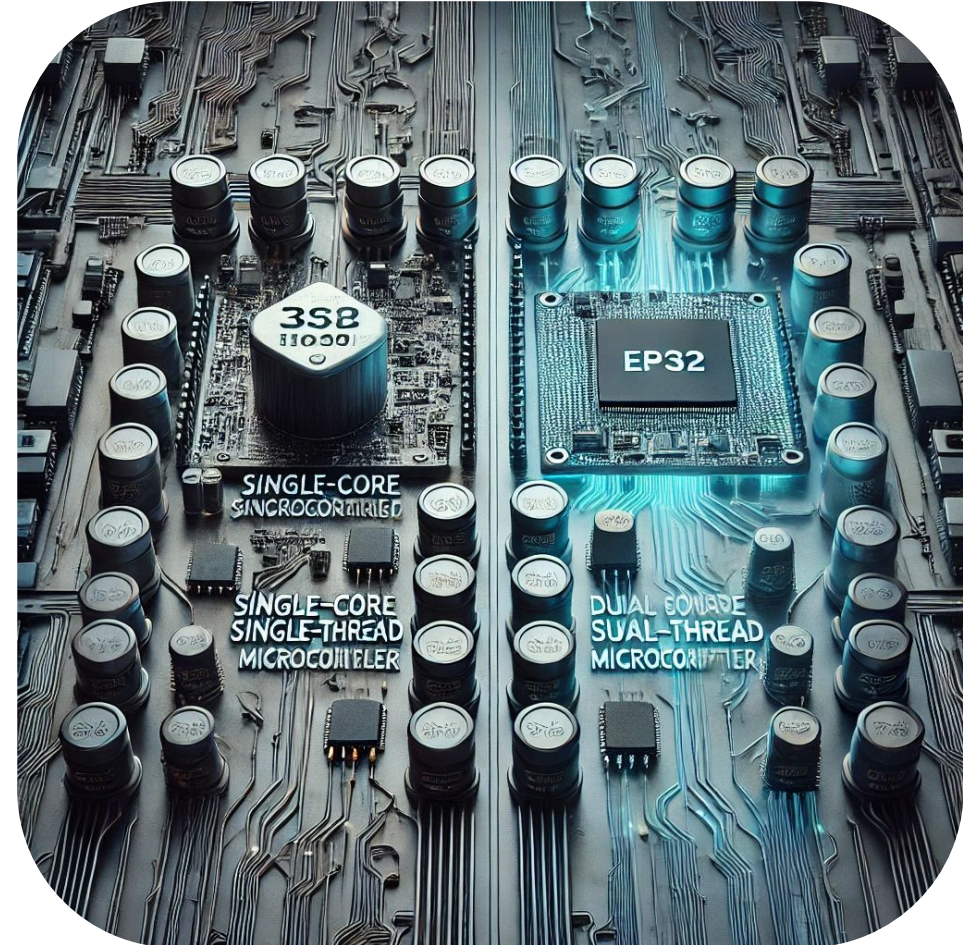
Constraints

Weak Capabilities of the Hardware

Single Core Microcontroller

Limitation: Arduino and ESP have single-core, single-thread architecture, limiting multitasking abilities.

Impact: Slower response times and potential delays in operations.

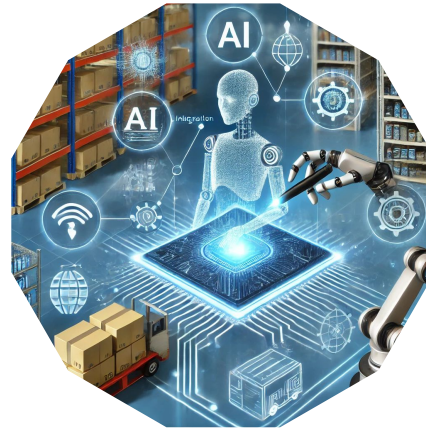


Future work



Expand System Capabilities

Enhance the system for larger warehouses and complex inventory tasks by scaling up hardware and software components.



Advanced AI Integration

Integrate AI algorithms for predictive inventory management and automated decision-making to optimize stock levels and reduce costs.



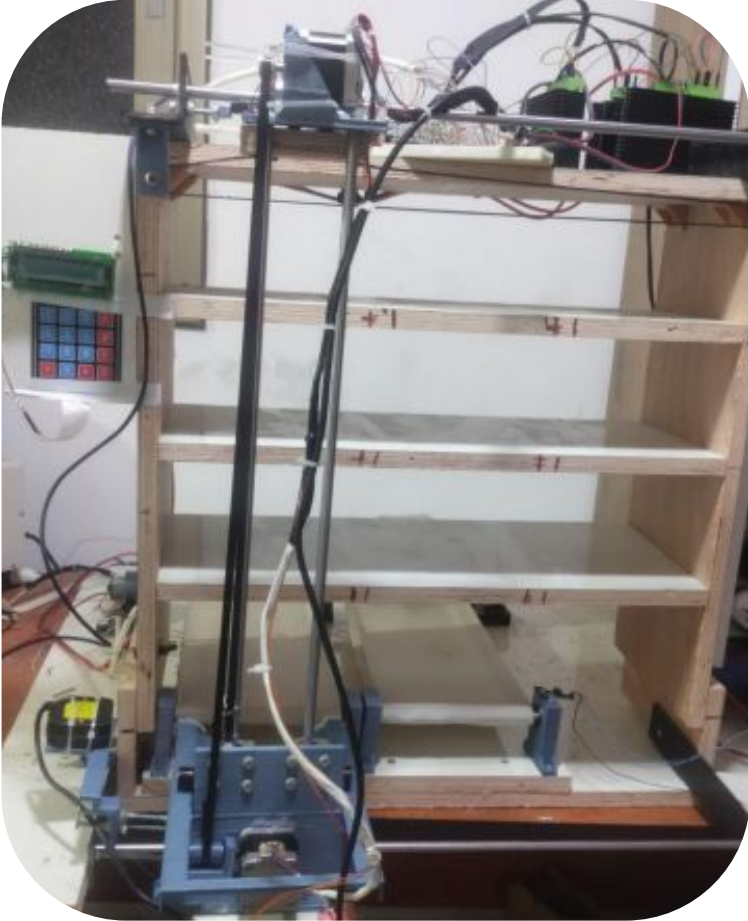
Enhanced User Interface

Develop a more intuitive and user-friendly interface to simplify user interactions and improve overall system usability.

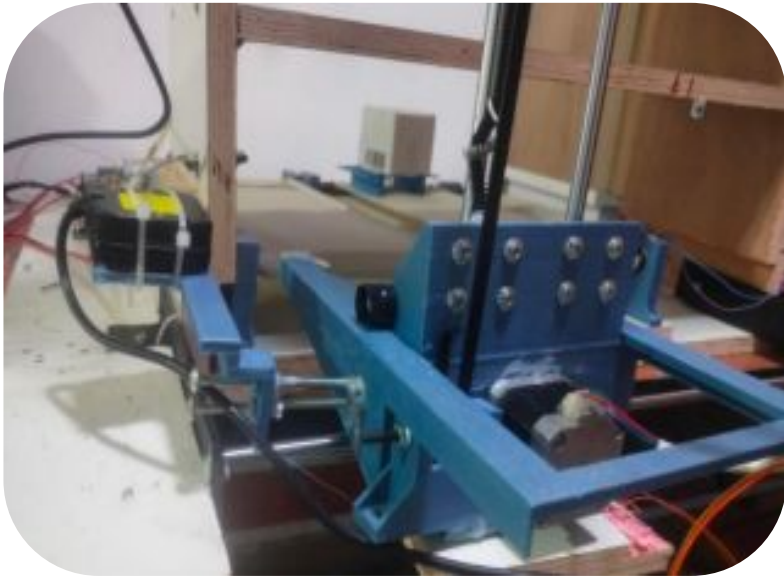
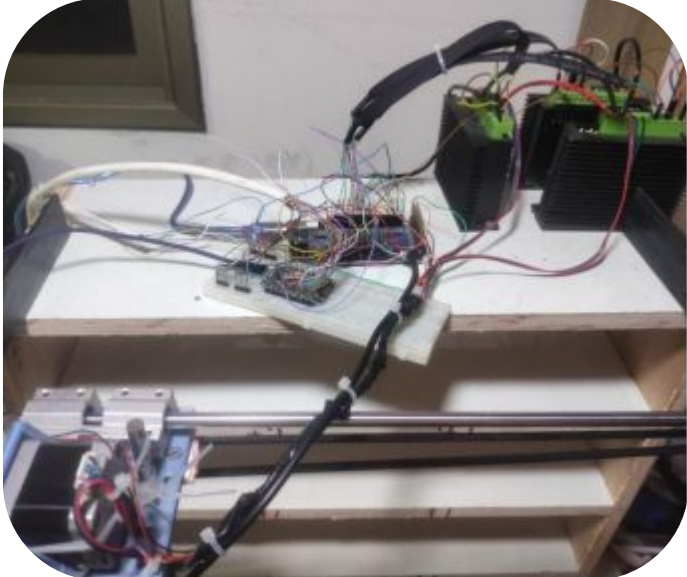
Project Demo



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Project Demo





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Students

**Ahmad Majed
Ameen Abo Diak**

Instructors

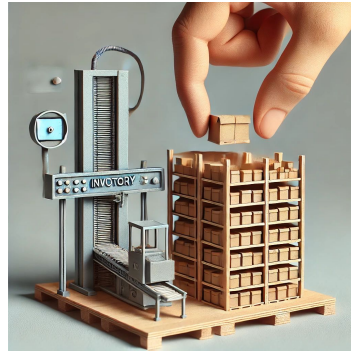
Anas Toma



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Thank You

Constraints



Size of the Machine

Description: The initial model is designed for a small area of 3x3 feet.

Challenge: Scaling up the machine to serve larger warehouses or commercial businesses



Budget Limitations:

The project is constrained by a limited budget.

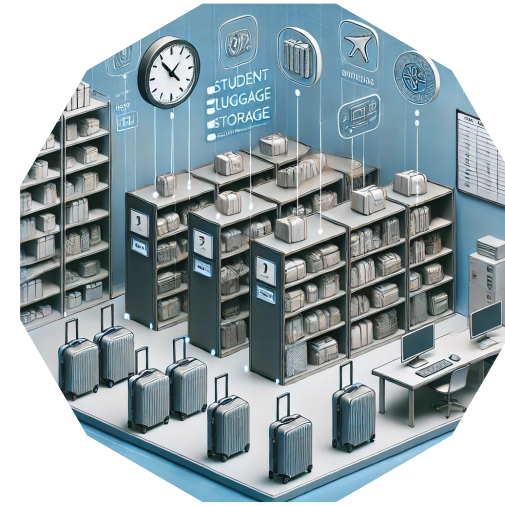
High-quality components can be expensive to implement the most efficient and robust solutions.

Target Group



Large Online Retailers

Efficient and accurate inventory management for handling large volumes, reducing errors, and speeding up order fulfillment.



Educational Institutions (Student Luggage Storage)

Simplified management and accurate tracking of student luggage, ensuring secure storage and quick retrieval.

Market Size and Statistics



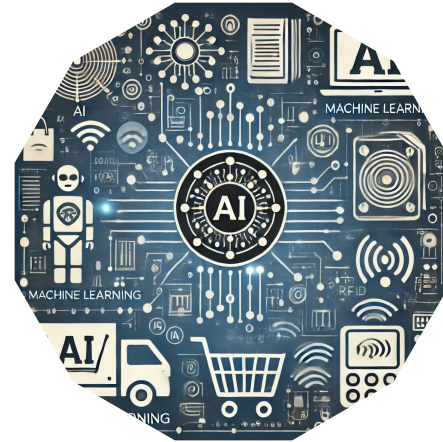
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Global Inventory Market

**Market Size (2023):
4.94 billion USD**

**Projected Market Size (2032):
12.19 billion USD**



Key Drivers

E-Commerce Growth
Technological Advancements
Supply Chain Optimization



Regional Insights

North America: Leading market due to early adoption and presence of major companies.
Asia-Pacific: Fastest growth driven by e-commerce and technological advancements.