Coimbatore Institute Of Technology, Coimbatore .

Career Guidance And Counselling Cell
Department Of Electronics And Communication Engineering

NATIONAL LEVEL HACKATHON – NEXUS 24

Title: Automated Material Handling System

Faculty Mentor Name: Ms.Susithra N

PS Code: Automated Material Handling System

Theme Name: Smart automation

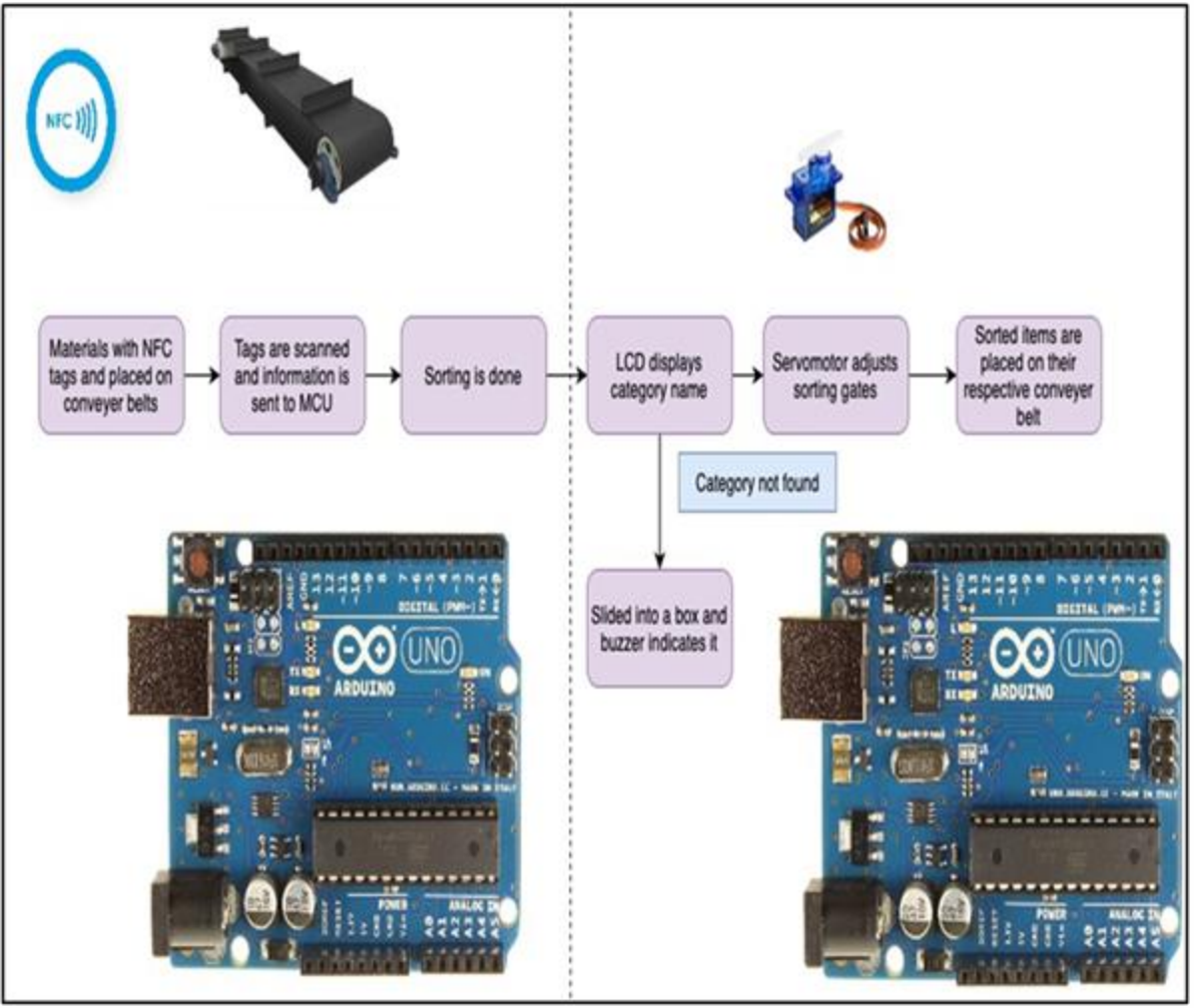
Team Name: Embedded enablers

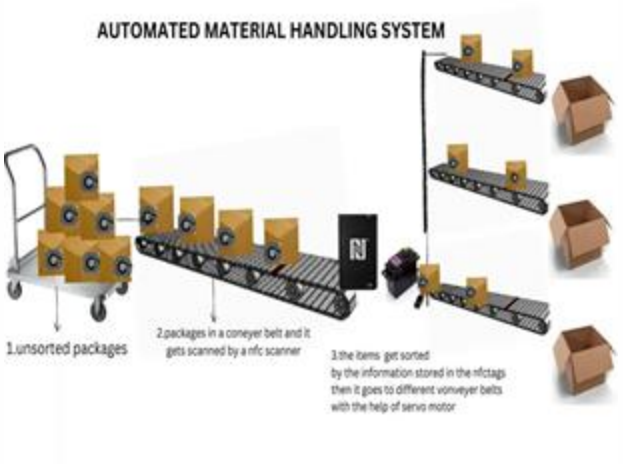
Team Members with college details: PSG Itech - Vennila A, Deeksha R, Harsha P, Neya S, Deepthi Sri R

Idea/Approach Details

- The proposed solution aims at creating a system to **automate the movement and sorting of materials** at a manufacturing facility.
- Our plan is to develop **accurate sorting algorithm** based on information read from **NFC Tags** and determine the criteria for sorting items into different racks.
- Our course of action is to implement the Idea using two **Arduino boards** - for scanning and movement using servo motors and integrate them through serial communication.
- The information of the material is stored in the NFC tags attached to it.
- As it moves in the conveyor belt, the materials scanned are with NFC scanner and with servo motor it moves to different **conveyor belts** can be further packed.

Block diagram of Proposed Idea





Proposed Technology

SOFTWARE REQUIREMENTS:

- Programming language: C/C++ for Arduino
- Data-structure used: Dictionary to store the information in key-value pair

HARDWARE REQUIREMENTS:

- Arduino uno board to act as MCU
- RFID-IC 533 module, RFID/NFC Reader
- 13.56 MHz ISO 14443A : NFC Type 2 NTAG213 HF RFID NFC NTag
- conveyor belts
- LCD display acts as a user interface to display the sorting category.
- Buzzer to indicate if it doesn't belong to any sorting category
- SG90 Servo motor
- Emergency stop button

It creates a loop where the Arduino continuously scans for NFC tags, processes the information, controls the servo motor for sorting, updates the LCD display, and responds to user interactions or emergency situations.

Feasibility and Sustainability

- NFC tags are compatible with the smart-devices and smart-phones which makes monitoring and control easier.
- NFC tags are compact and can be integrated into small items or packaging, making them suitable for sorting applications with limited space.
- The automated sorting system efficiently does the material handling process, this project does not inherently contribute to sustainability.
- The chosen technologies and processes prioritize functionality and operational efficiency rather than focusing on introducing green features or practices

Scale of Impact and Future Scope

SCALE OF IMPACT

- Streamlines material handling, cutting labor, errors, and optimizing workflows.
- Extending an NFC-based material handling system to include inventory management capabilities.
- Flexibility and adaptability to changing business needs.

FUTURE SCOPE

- **Integration with IoT and AI:** Combining with AI and IoT devices could enable even greater automation and connectivity, leading to enhanced efficiency and data-driven insights.
- **Blockchain for Supply Chain Traceability**: Implementing blockchain technology for supply chain traceability could enhance transparency and trust by securely recording and tracking the entire lifecycle of products, from raw materials to end customers.

Lean Canvas

Problem

- Integration complexity
- Range of NFC

Solution

- Integrate the material handling system with database management software.
- Use a combination of RFID and NFC .

Unique Value Proposition

Highly **flexible and customizable** approach to sorting items.

Smartphones can be the Core element of the material handling system making it easily accessible and user friendly.

Unfair Advantage

We use algorithms to precisely sort the items into various categories based on the information stored in the tags

A **lcd display** shows the sorting categories and the number of items it,which is useful in inventory management to maintain the stock

Customer Segments

Large scale :

- Retailers
- Logistics Providers

Small scale:

- Small Business Owners
- Grocery Stores
- Community Libraries
- Any facility where materials need to be sorted based on specific parameters could be a potential user.
- Businesses engaged in supply chain management may use the system to enhance the sorting and categorization of materials.

Existing Alternatives:

Vision Systems,Machine Learning Algorithms,
Robotic Arms,Automated Guided Vehicles (AGVs)

Key Metrics

Channels

Through marketing efforts, including online advertising, industry events, and promotional materials.
We will offer demonstrations, either in-person or through virtual means, to showcase the system's capabilities.
we engage with potential customers to understand their specific needs

Cost Structure

Fixed cost : 4500
(Arduino Uno boards,RFID-IC 533 module,RFID/NFC scanner,Conveyor belts,Lcd display,Buzzer,Emergency stop button,Sg90 servo motor,NFC Type 2 NTAG213 HF RFID NFC NTags,esp8266 wifi module)
Variable cost: 1500

Revenue Structure

The revenue structure is made by the contributions from the team members
It is a self financed project.

REFERENCES IF ANY

These websites were checked for feasibility

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https://arduinogetstarted.com/tutorials/arduino-rfid-nfc

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QUESTIONS??

THANK YOU