IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

METAL SORTING IN FOOD INDUSTRY

[1] Neha Dutte, [2]Sheetal K. Pawar, [3]Shubham Yenkure [4]Atharva Shirke

[1]Lecturer, MIT Polytechnic, Pune, [2]Lecturer, MIT Polytechnic, Pune, [3]Student, MIT Polytechnic, [4] Student Pune MIT Polytechnic, Pune

[1]Department of Electronics and Communication,

[1]MIT World Peace University, Pune, India

Abstract: The objective of this project is to detect metal release in the food during processing in the food industry. Key findings are examined in both high-level scientific articles and papers focusing on industry issues. Examples of food products with a corrosive effect are given, and cases concerning processes, storing equipment as well as cleaning and sanitizing procedures are reviewed. In the food sector, stainless steel is the most extensively utilized metallic material; nevertheless, other metals and their alloys are also detected.

Index Terms **– Metal release, food sector.**

I. INTRODUCTION

Metal detectors for food are primarily used to safeguard consumers. Metallic contamination in food items during the manufacturing process cannot be completely avoided, even with extreme precaution. Metal particles that enter the product during the production process or already are contained in the raw material may cause serious injuries to consumers. Compensation suits and costly recalls are among the many and significant implications for the manufacturing organization. Even bigger like longer-lasting damage is caused by the negative brand image and the loss of consumer trust caused by impure food products. Metal detectors for food provide effective protection against ferrous and non-ferrous metals (aluminum, stainless steel, etc.). They can be installed in every step of the production process and can be used for many different applications, e.g. for the inspection of bread and bakery products, meat and sausage product, fruit, vegetables, dairy products, spices, sugar, etc. In addition to consumer protection, metal detectors also are used to protect machinery. Even smallest metal particles can lead to machinery failure. Expensive repairs and production downtimes are the consequences, often followed by revenue decreases.

II. PROBLEM DEFINITION

Sorting scrap material using various automated approaches has received a lot of attention in recent years. Separation of shredded material is one of the several phases in the recycling of non-ferrous metals. In our project, we propose the concept of "Metal & Non-metal Sorting Using Metal Detector". In this project we are developing a robotic arm which will first sense the metal, then the arm will move to pick up the metal and then throw it away from the food.

III. PROPOSED METHODOLOGY

Metal and Non-metal component sorting Robotic arm works on the principle of utilizing electric energy and converting it into mechanical energy to carry the objects to the sorting station. It uses Raspberry-pi for its operation. The main function of this device is to detect the metallic component in the food and remove it. It consists of a conveyor belt, electric motor. The electric supply is used as a source of energy in this system. When the current supply is turned on, the current is sent to the system via a step down transformer, which transforms the high voltage into a low voltage of up to 12 volts.

The figure 1 shows block diagram of our project

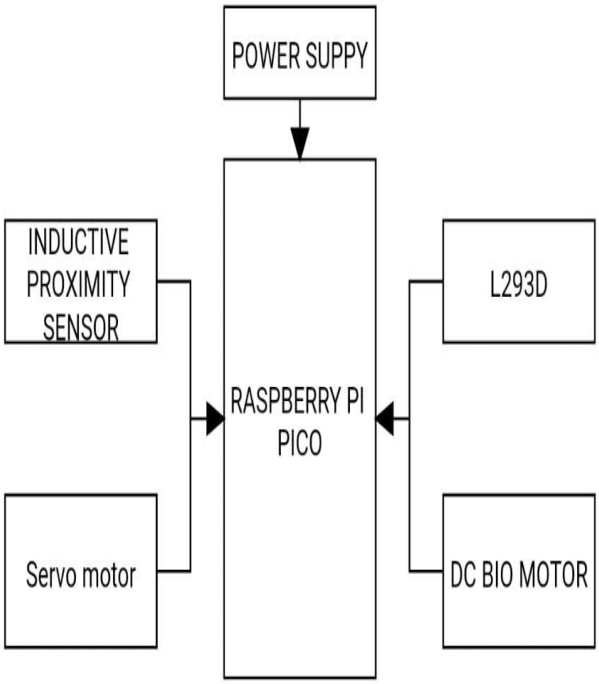

Fig 1: Block diagram

IV. WORKING

The operation starts when the user presses the Push Button 1 button to launch the logic. When the predefined logic is satisfied, i.e. no objects must be initially placed on the conveyor belt, the belt starts moving. The Green Bulb lights up as soon as the button is pressed, signaling that the process has started. Power is down-converted and supplied to the 12V DC motor to power the conveyor belt. We have defined 4 inputs and 5 outputs in the PLC module. The user then starts placing the materials for sorting. The material, say X, goes through the metal detector coil first. If X is a metal, a specific frequency is detected, signaling that X is a metal. This data is then transmitted to the PCB board, which functions as a metal detector circuit.

V. RESULT

The figure 4 shows actual working model of the project. It consists of a robotic arm and a proximity sensor and a metal detector. According to the figure 5, when the object comes near the sensor and if it is metal, the robotic arm lifts the object and keep it away as shown in the figure 6

Fig 4: Metal coming towards the Robot

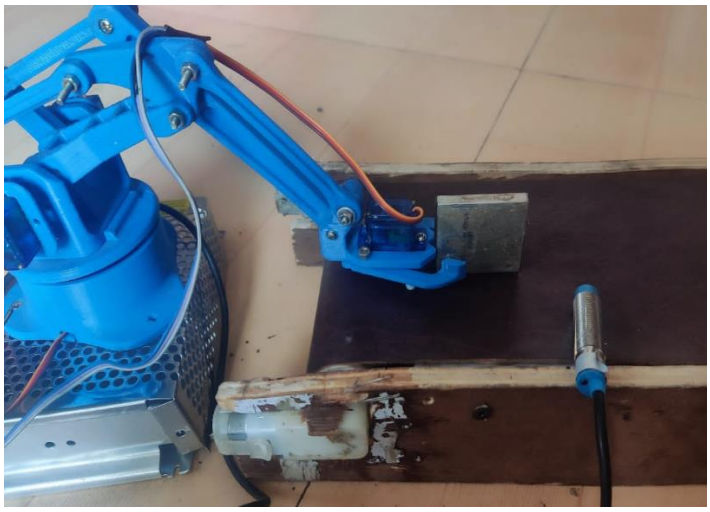

Fig 5: Detection of metal

Fig:6 Removing metal

VI. CONCLUSION

Thus we have developed a robotic arm for sorting metals from non-metals. This paper shows details of the project. This device could be used in food Industry to sort metal particles in food.

REFERENCES

[1] Ur, Athiq, Raza Ahamed, and Wajid Ahamed. "A Domestic Robot for Security Systems by Video Surveillance Using ZigBee Technology" 2, no. 5 (2013): 448–453.

[2] M.A.K. Bahrin, M.F. Othman, N.H.N. Azli, M.F. Talib Industry 4.0: "a review on industrial automation and robotic" Jurnal Teknologi, 78 (2016), pp. 6-13.

[3] P. Zheng, Z. Sang, R.Y. Zhong, Y. Liu, C. Liu, K. Mubarok, X. Xu "Smart manufacturing systems for Industry 4.0: conceptual framework, scenarios, and future perspectives"

[4] P. Zheng, Z. Sang, R.Y. Zhong, Y. Liu, C. Liu, K. Mubarok, X. Xu "Agricultural Robot for automatic ploughing and seeding"