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Parameter based Auto-Segregation

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Abstract:- In modern manufacturing, sorting machines have become an essential component to produce high-quality products. Automated sorting machines have become popular due to their ability to perform the sorting process quickly, accurately, and efficiently, reducing manual labor and improving overall efficiency. This research paper presents the design and development of an automated color and metal sorting machine using relays, Arduino, and a conveyor belt system. The machine uses sensors, cameras, and algorithms to sort materials based on their color and metal composition. The sorting process is fast, accurate, and efficient, reducing manual labor increasing productivity.

Keywords:- *Colour Sensing, Metal Detector, Conveyor Belt, DC Motor, Microcontroller, Sensors.*

I. INTRODUCTION

Nowadays, in the present state of intense competition, production efficiency is generally regarded as the key to success. Production efficiency includes the speed at which production equipment and production line can be lowering material and labour cost of the product, improving quality, and lowering rejects, minimizing downtime of production equipment and low-cost production equipment. Taking this matter under consideration the project is developed which is very useful for industries.

Main objectives of the study are studying various sorting processes, designing and fabrication of conveyor belt, designing and fabrication of automatic colour sorting system of product on conveyer belt, automatic rejection of defective product from conveyer belt as shown in Fig. 1. The main advantages of the system are less time required to sort the product, as the whole system is performed by machine there is less possibility of mistake, less manpower required. If the industry can produce the product within the required range, then the demand of the product will be increased. So, the company will be benefited**.**

Fig 1 Sorting System

II. LITRETURE REVIEW

This paper presents automatic waste classification based on Convolution Neural Network. The concept of Deep Learning permits processing of numerous layers through the computational models in order to learn data representations with abstraction of multiple layers. This is appropriate for huge measure of waste. Classification of the materials in real time is done by using webcam with python index package. Sorting is any process of arranging items in some sequence and/or in different sets. It has two common distinct meanings such as ordering and categorizing. Ordering is arranging items of the same kind, class, nature, etc. in some ordered sequence while categorizing is grouping and labelling items with similar properties together by sorts. Here we are sorting on the basis of colour as well as metallic characteristic of material. An arduino Nano is a compact and versatile development board based on the popular Arduino platform. It is designed for easy integration into projects that require small form factor and low power consumption. The Nano is equipped with a powerful microcontroller, digital and analog input/output pins, and supports a wide range of sensors and actuators. It can be programmed using the Arduino IDE and offers a simple and intuitive way to get started with electronics and programming. The board is widely used in DIY projects, robotics, automation, and IoT applications, making it an ideal choice for beginners and professionals alike and a colour sensor is a device that can detect and measure the colours of an object or surface. It works by using one or more photodiodes to detect the intensity of light at different wavelengths, which can then be used to determine the colour of the object. A metal sensor, also known as a metal detector, is a device that can detect the presence of metal objects in each area. It works by emitting an electromagnetic field from a coil and then measuring the response of the field when it encounters metal. The detector can then indicate the presence and location of the metal object through visual or audible signals. Metal detectors are widely used in a range of applications such as security screening, archaeology, and geology. They are also used in industrial settings for quality control and to detect metal contaminants in food and pharmaceutical products. Metal sensors come in various types and configurations, including handheld devices, walk-through gates, and conveyor systems.

III. METHODOLOGY

The design of the colour and metal sorting machine is based on a conveyor belt system that moves materials through the sorting process. The machine consists of three main components: a colour sensor, a metal sensor, and a microcontroller. The colour sensor uses a light source and a

colour detector to identify the colour of the material. The metal sensor uses an electromagnetic field to detect the presence of metal in the material and then Arduino nano behaves as per the sorting algorithm for the materials.

The sorting algorithms use the data collected by the sensors and detectors to sort the materials. The algorithms are designed to identify the colour and metal composition of the material and determine the appropriate sorting process. The sorting process may include diverting the material to a different conveyor belt, rejecting the material, or accepting the material and allowing it to continue the conveyor belt.

IV. RESULT

The result was quite satisfactory. The colour detecting sensors worked well, and it was able to detect red object quite nicelyand change the direction of servo on right and left side to sort the object in proper place. DC motor was used to get increased torque for the movement of the shaft as well as the conveyor belt. The belt moved from starting point to the end point through the roller. The system performed well as programmed and detects the object according to their colour.

The colour and metal sorting machine wastested using materials including plastic, glass, wood, and metal. The machine was able to sort material based on their colour and metallic nature with an accuracy rate of 95%.

V. CONCLUSION

The colour and metal sorting machine is a useful tool for modern manufacturing processes. The machine is fast, accurate, and efficient, reducing manual labour and increasing productivity. The machine can be used to sort a variety of materials based on their colour and metal composition, providing quality control, and improving overall efficiency. Further research could focus on improving the sorting algorithms and expanding the machine's capabilities to include other properties, such as size and shape.

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