

## **Arduino Based Lemon Sorter Machine**

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**Abstract:** *In today's life, the demand for automation is highly increasing in industry. Arranging objects based on their color shade is a very troublesome task. This paper gives us an idea about sorting the fruits as per their color project. Here we are designing and implementing an efficient color sorting machine using color sensor TCS3200 based on Arduino NANO. This project delivers high accuracy, performance, and repeatability. Easy to operate and construct which reduces human errors, human efforts, and expenses of an industry.*

**Keywords:** *Arduino NANO controller, TCS3200 color sensor, servo motors, switch, ply board.*

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### **I. INTRODUCTION**

Nowadays high accuracy and performance in their products is the common need in any industry. Color is one of the best criteria on which we can sort different objects at the industry level. Paper gives us an idea about how the color sorting machine works and reduces human efforts. These color sorters can be used in food industries or FMCG (Fast-moving consumer goods) to sort food, fruits, etc... This Machine is constructed using plywood.

### **II. LITERATURE SURVEY**

The compilation of system and interfacing of different components, sensors, servo motors, Hardware, and software interfacing of the system is prescribed by the "Software Interfacing of TCS3200 color sensor with Arduino".

"Snehal Shirgave [1] in this paper a color sorting robot is researched, designed and created with an Arduino UNO microcontroller, TCS3200 color sensor, and other electronics components. They found that the color sensor gives accurate results when it tested different coloured objects.

Mr. Pratik Bapuso Patil [2] was researching a system based color sorting robot using this TCS3200 color sensor. They have used conveyor belts and mechanical mechanisms to sort the object.

Kunhimohammed C. K [3] has used two conveyor belts, TSC3200 colour sensor, D C motor, arduino uno. The both conveyor belts have been used in two different works, one for sensing the colour of the object and the other one is for the shorting of the object according to the colour.

G. Indira [4] in paper the research has been done on colour sorting robots by using conveyor, arduino uno, servo motors and TCS3200 colour sensor. They used the converter to place the object to the hopper.

### III. SYSTEM BLOCK DIAGRAM

As shown in fig1. The system consists of a hopper, color sensor module, servo motors, Arduino NANO, and color sorted container. The top servo motor rotates towards the TCS3200 color sensor when colored objects are placed on the slot of the top servo motor. TCS3200 is the color sensor that detects light reflected by an object and converts it into frequency. The bottom servo motors are used to move a slider according to the color detected of the object and placed it to the given container as per their color. Input and output operations are controlled by an Arduino NANO microcontroller.

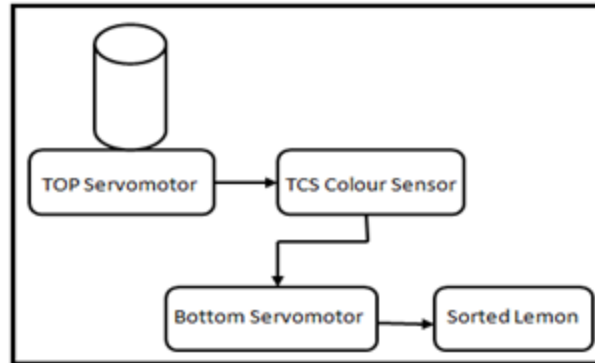


Fig.1

### IV. COLOUR SENSOR

The Color Sensor is a finished tone locator. We can utilize TCS3200 shaded sensor chips. It can identify and measure an almost boundless scope of obvious shadings in a limited way. The figure 2 shows the image of the colour sensor TCS3200.



Fig.2

### V. SERVO MOTOR

The servo motor is a closed-loop instrument that consolidates positional input to control the rotational or direct speed and position. The engine is controlled with an electric signal, either simple or computerized, which decides the measure of development that addresses the final order position for the shaft. A type of encoder serves as a sensor providing speed and position feedback as shown in fig3. This circuitry is built right inside the motor housing which usually is fitted with a gear system. We will control the servo motor by Arduino NANO.



Fig3

Fig3. shows the actual process of the rotation of the shaft as per the signal provided by the Arduino NANO. This signal can be in analog or in digital form. The encoder reads the signal and provides the proper movement as well as the speed of the shaft, according to the given signal.

## VI. METHODOLOGY

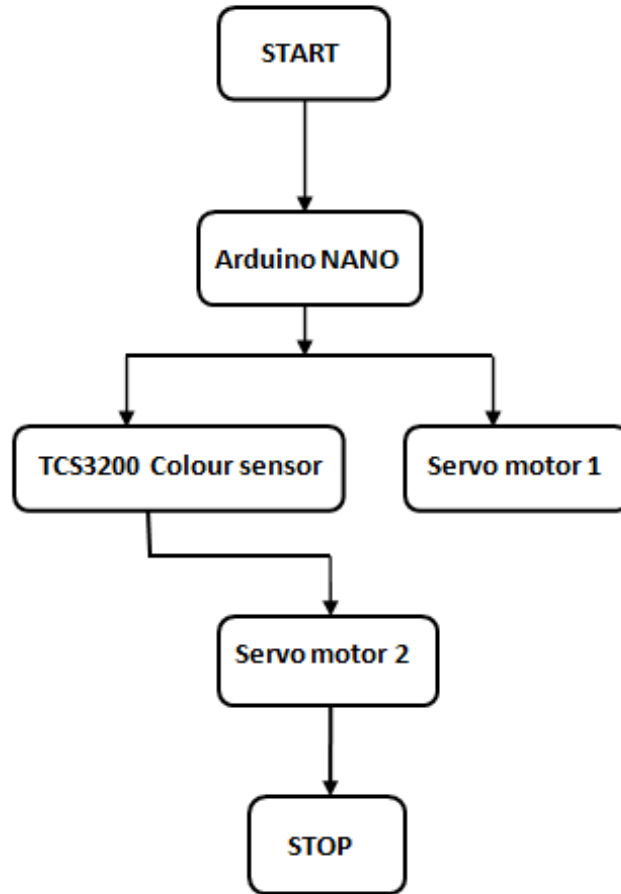


Fig.4

The fig4 shows the actual structure of the machine. The Power supply is given to Arduino NANO through the external sources and the Arduino NANO gets activated and passes the signal to the TCS3200 colour sensor and Servo motor 1. The shaft of the servo motor will rotate at the point where the TCS3200 colour sensor is placed. The TCS3200 sensors detect the colour of the lemon and pass the signal to the arduino NANO, which will provide a signal to the servo motor2 and the servo motor 2 rotates and moves the slider as per the signal it will get.

## VII. RESULT

Machine is working properly , the top motor collects lemon from a container and places it on the platform to detect color. After the colour detection process the bottom motor will rotate according to colour detected and put the lemons in their respective boxes.

The figure 5,6 , and 7 shows the final working of the machine.



Fig.5



Fig.6



Fig.7

### VIII. CONCLUSION

In this project the development of a lemon sorting machine has been achieved. Lemon sorting machine gives precise output. It can be improved by replacing the container automatically, once it gets filled. As per our requirement we can put limitations on objects to be sorted and replace fully containers with the empty one using an arm.

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