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Utilisation of Colour Sensor and Arduino for Object Sorting Mechanism

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Abstract: ***Sorting of products in an industry is a tedious industrial process, which is generally carried out manually. Continuous manual sorting creates quality consistency issues. Segregation based on different characteristics like weight, colour, type require different equipment for weighing and then separating. We have proposed an efficient method which uses load cell, inductive sensor and TCS 3200 colour sensor for identifying and segregating on the basis of weight, colour and type. The system rejects and discards objects that are not of required characteristics by pushing them out of conveyor line using a flipper mchanism. A circular container, having three partitions is used to collect objects of three different colours***
Keywords: Automatic, Sorting, Conveyor Belt, Arduino, IR sensor

I. INTRODUCTION

The digital object counter is a cost effective and a simple system. It overcomes the problem of manual counting of objects. Everything is digital, so the signals can be used for further analysis and is compatible with other digital devices. If this system is implemented, then automation in the product counting can be achieved. Also, there is no hazardous elements used in the circuitry and hence it can be used even at hazardous atmospheres in an industrial area.

The logic is very simple, the circuit has TSOP1738 sensor which detects whether there is a object or not in front of it. The microcontroller will take the input from the TSOP1738 sensor, process it and sends the output to the LCD display unit which will display the number of products counted.

The TSOP1738 is a IR detecting device, it detects the IR rays transmitted at 38kHz frequency (it is transmitting frequency not the frequency of the IR rays). Its output is not affected by the surrounding lights; therefore it will sense the object only. To transmit IR rays at 38 kHz the astable multivibrator mode of 555 IC is used. The output of the sensor is processed by the microcontroller. After processing it the controller's output signal is fed to the LCD display which displays the output.

II. BLOCK DIAGRAM

To implement the project we require both hardware and software . The block diagram of the project is illustrated in the figure below.

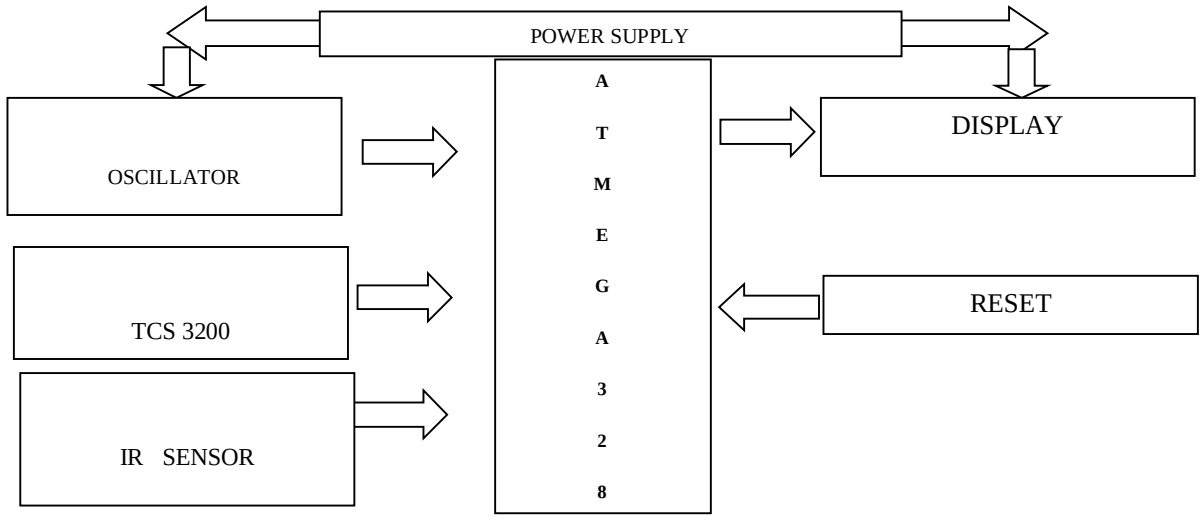

Figure 1: Block diagram of digital object counter using Microcontroller

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III. CONSTRUCTION DETAILS

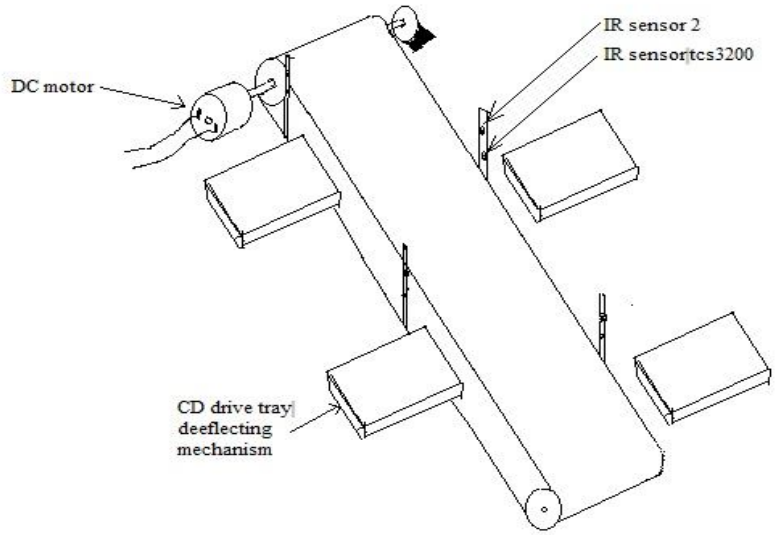
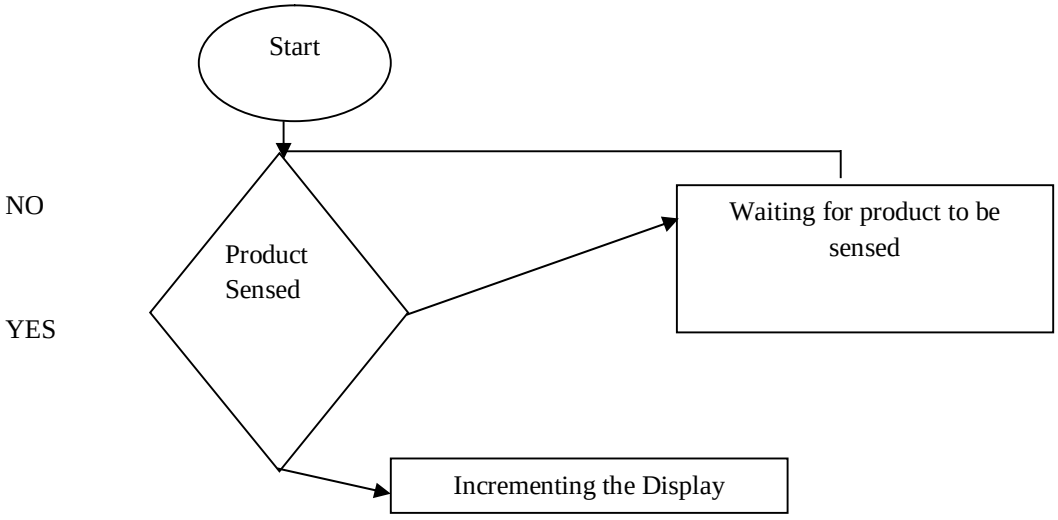


Figure2: Model Overview Diagram

A. The unit consists of the conveyor belt which is driven by electric motor.
B. The conveyor belt is mounted on the mild steel frame which is fabricated using the angles and channels.
C. At the two ends of the frame, using journal bearing, two drum pulleys are bolted to the frame over which the belt runs.
D. For the drive, the electric motor is used. For the speed reduction, the sub frame is fabricated which is having intermediate shafts.
E. This speed reduction system contains two stage reduction using belt pulley assemblies.
F. For the purpose of idling, the sheet metal is used which also acts as scrubber to reduce the dust on the belt.
G. Then sensors are located on the conveyor belt.
H. For the wiring and electronic assembly, the separate sheet metal block bolted to frame.
I. For the pushing and sorting purpose, the pushing mechanisms are mounted on the frame.
J. These mechanism consist of simple piston crank mechanism.
K. After sorting, the provision is made for automatic switching off the conveyor belt.

IV. FLOW CHART



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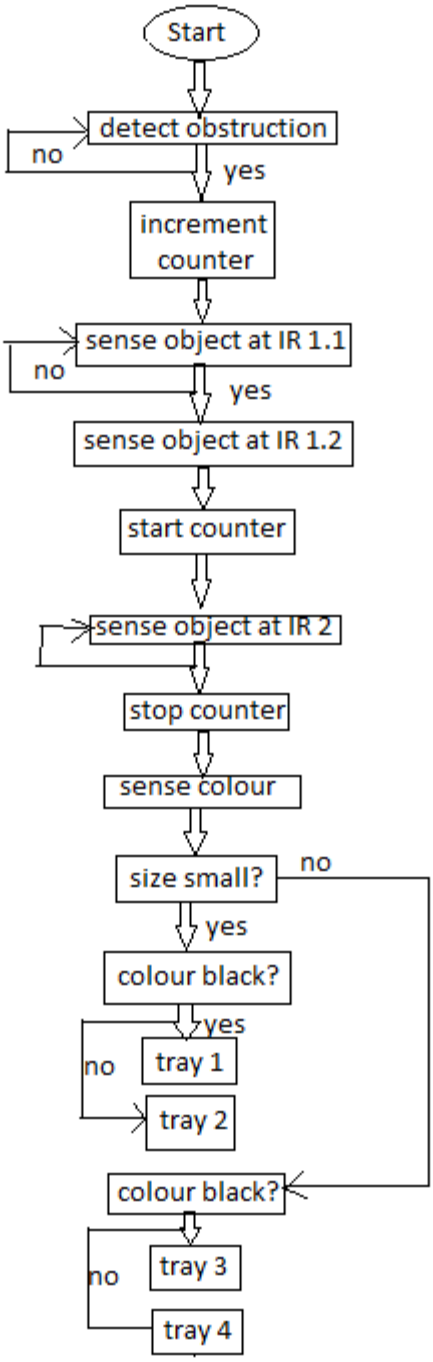

V. ARDUINO

Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments.ARDUINO BOARDS are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language(based on Wiring), and the Arduino Software (IDE), based on Processing.

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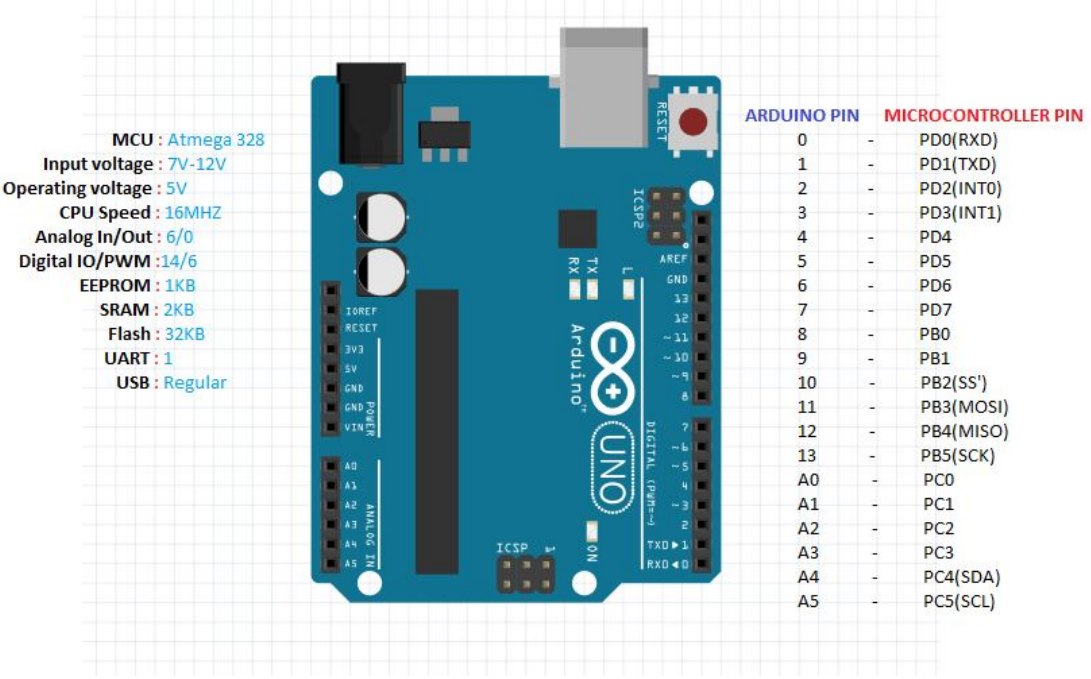

1) *Programming languages for arduino-:* he Arduino language is merely a set of C/C++ functions that can be called from your code. Your sketch undergoes minor changes (e.g. automatic generation of function prototypes) and then is passed directly to a C/C++ compiler (avr-g++). First, the Arduino compiler/IDE accepts C and C++ as-is. In fact many of the libraries are written in C++. Much of the underlying system is not object oriented, but it could be. Thus, "The arduino language" is C++ or C.

VI. RESULT

The objects are sorted out with respect to color such as red, green, blue in respective box.

VII. CONCLUSION

A. The shading sensor IC TCS3200 demonstrate verging on stable reaction in different daylight conditions. The framework is working with open circle.

B. A superior determination can be accomplished if shut circle control is fused. The framework reactions are at a bit slower than anticipated.

C. It can be enhanced by utilizing a more propelled shading sensor and microcontroller. Client interfaces additionally can be given as an alteration which will empower the on interest reconfiguration of the development betterly.

D. In this way we can accomplish framework utilizing headway as a part of innovation in the field of Embeded framework.

VIII. FUTURE SCOPE

It is very useful in wide varieties of industries along with the help of PLC and SCADA, especially in the packaging section. Automatic sorting machine enhances efficiency, practicality, and safety of operators. It ensures remarkable processing capacity as well as peerless performance including color detection. Of course we need to add high speed DC motors and sensors with appreciable response to speed up the system for industrial application. The model can be improved by making some changes in the program and components. Some suggestions are given below.

A. We can add a load cell for measurement and control of weight of the product
B. We can also add a counter for counting the number of product
C. Speed of the system can be increased accounting to the speed of production
D. The system can be used as a quality controller by adding more sensor
E. The sensor can be changed according to the type of produc

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F. The DC motor can be replaced with stepper motor

VII. APPLICATIONS

This project has numerous applications in different fields, as this system gives the sorting of items, in stream of articles by multi sensing. Mostly this finds the essential application in agribusiness field where it can be utilized to sort the distinctive horticulture items like grains, lemons, almonds, grapes, and diverse sort of natural products. For people it gets to be comber aggregate undertaking to deal with the articles with great additionally the likelihood of exactness is less. In industry it can be utilized for sorting of different protests and instruments with distinctive sizes. By thus the proposed venture can be utilized. It discovers application in gigantic path in agribusiness, industry.

Digital Object Counter can be used in counting the objects efficiently. This is a low cost efficient device and consumes low power. It can be even used in-

A. Industries where the number of products or objects can be counted
B. In the parking areas to know the number of vehicles have entered.
C. Food Industr
D. Agricultural products scaling and gradin
E. Airport

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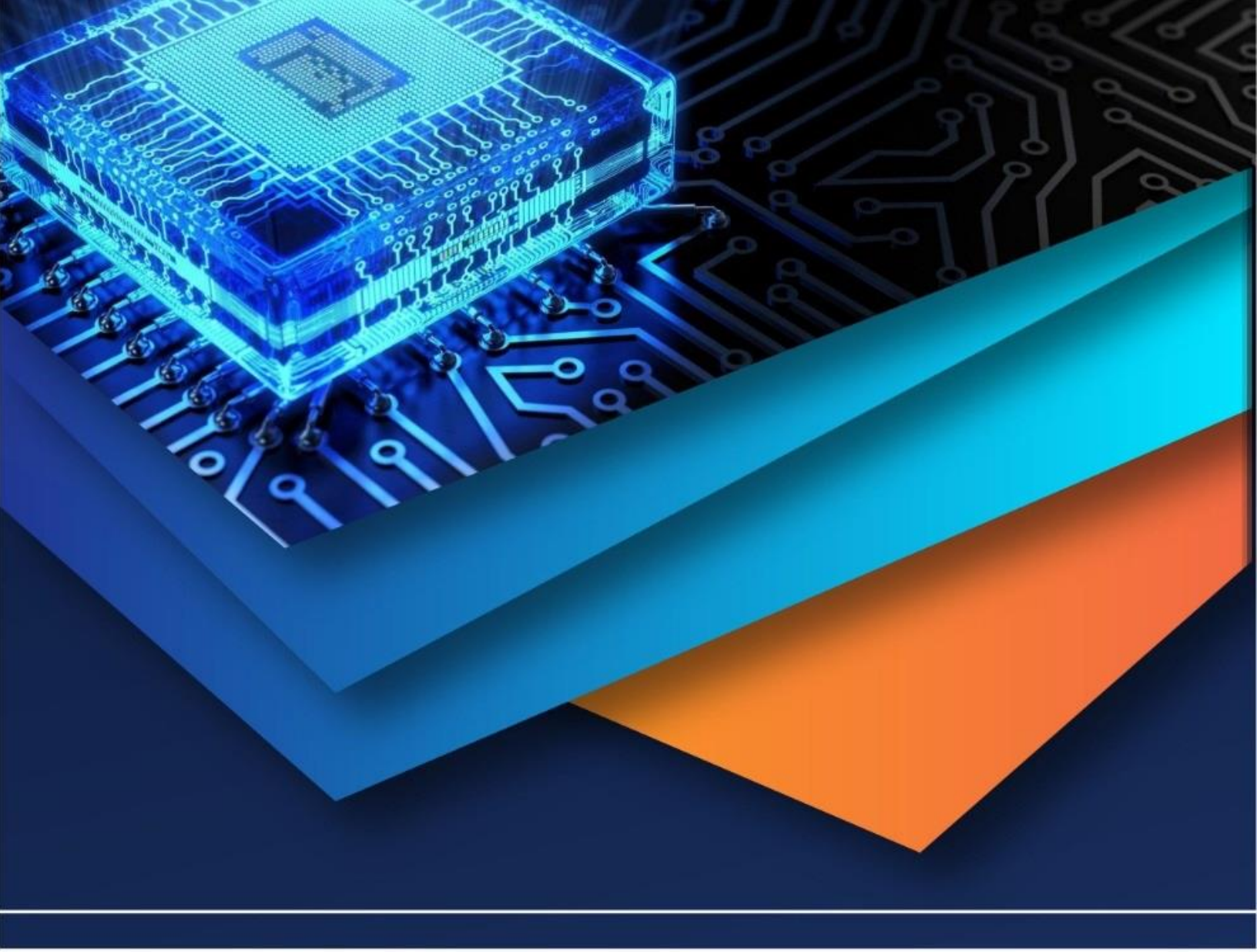

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