

RGB Color Sensor based Object Detection & SCADA

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ABSTRACT

This paper describes the new technique used for the RGB color detection. The proposed technique illustrate the new methodology that can be used for the primary color detection and applications in various industries. It is color sensor that sense mainly red green and blue colors. This color sensor is designed by basic elements like primary color LED and light sensing device like LDR or photo diode. Basic principal of working are reflectivity of the light emitted by the LEDs from the object under test. Sensor provides a means for gathering information on manufacturing operations and processes being performed. In a lot of instances sensors are used to transform a physical stimulus into an electrical signal that may be analyzed by the manufacturing system and used for making decisions about the operations being conducted. The purpose of sensors is to inspect work in progress and to observe the work-in-progress. True color sensors are based on one of the color models, most commonly the RGB model (red, green, blue). Many color sensors are able to sense more than one color for multiple color sorting applications. Depending on the difficulty of the sensor, it can be programmed to know only one color, or multiple color types or shades for categorization operations. In this report will be focusing on the application of color sensor using conveyor system for sorting RGB color.

Keyword: - RGB , LDR, LED, LCD, PLC, SCADA, LMPS, DC, USB..

1. INTRODUCTION

Automation is the use of control systems for handling different processes and machineries to replace human efforts. Automated systems generally use complex algorithms which increase the cost of the design and the power consumed. But this not only reduces manual efforts, time consumed, but gives more time to work on factors like aesthetics. Using automation also prevents danger which might occur when humans are made to work in hazardous environments. Thus, use of automation is effective in manufacturing industry. Sorting based on colour is done in many industries. Automated sorting also reduces the labour cost and the production time. The error caused due to human negligence are avoided by the use of automated system by colour based sorting using a colour sensor. Color Sensors use RGB filters to detect and perform color measurements of objects placed in front of the sensor. Hence when an object is placed in front of the sensor, it will display the same color through a LED. A 'color' is an interaction between a very small range of electromagnetic waves and the eyes and brain of a person. What people call RGB are just ways of categorizing what their brain experiences. True RGB color sensors are based on one of the color models, most commonly the RGB model. A large percentage of the visible spectrum can be created using these three primary colors. Many color sensors are able to sense more than one color for multiple color sorting applications. Depending on the complexity of the sensor, it can be programmed to distinguish only one color, or multiple color shades for categorization operations. 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, nature, class etc. in some ordered sequence while categorizing is grouping and labeling items with similar properties together by sorts.

2. RELATED WORK

Researcher group presented [1] that RGB sensor can be used for sorting for a specific application, this was very useful as this could save the money as colour sensor was less costly than the camera. And this can be used for small scale as well as large scale applications. We have also used an RGB sensor to detect the objects according to their colour.

Researcher group presented [2] have proposed that RGB colour sensor is detecting the objects and further the objects are being sorted physically by actuator. This helped in doing two operations at the same time that are colour detection and Sorting. We have also used this method for our object detection and sorting process.

Researcher group presented [3] that colour sensor can be controlled automatically by Microcontroller, this method was very useful but it was time consuming.

Researcher group [4] tried to improve this problem by using PLC. This was very efficient in large scale industries. And this helped to improve the Automation in the industries for object detecting and sorting. And the time was also reduced for the operation.

We have also used a PLC (Programmable Logic Controller) in our Project. So we have time efficient Project.

We have also used Conveyor Belts so that the objects can pass through the conveyor belt.

3. PROPOSED SYSTEM

A programmable logic controller or programmable controller is an industrial digital computer which has been adapted for the control of manufacturing process. There are two types of contact in PLC and they are normally open and normally closed switches. A normally open contact means the contact is on when pressed/closed, and a normally closed contact is on when open/not pressed. Contacts represent the states of real world inputs like sensors, switches, if the part is present, empty, full etc. PLC's also consist of coils which are output like motors, sensors, light, drivers etc. SCADA (supervisory control and data acquisition) is a category of software application program for process control, the gathering of data in [real time](#) from remote locations in order to control equipment and conditions. SCADA is used in power plants as well as in oil and gas refining, telecommunications, transportation, and water and waste control.

SCADA systems include hardware and software components. The hardware gathers and feeds data into a computer that has SCADA software installed. The computer then processes this data and presents it in a timely manner. SCADA also records and logs all events into a file stored on a hard disk or sends them to a printer. SCADA applications warn when conditions become hazardous by sounding alarms.

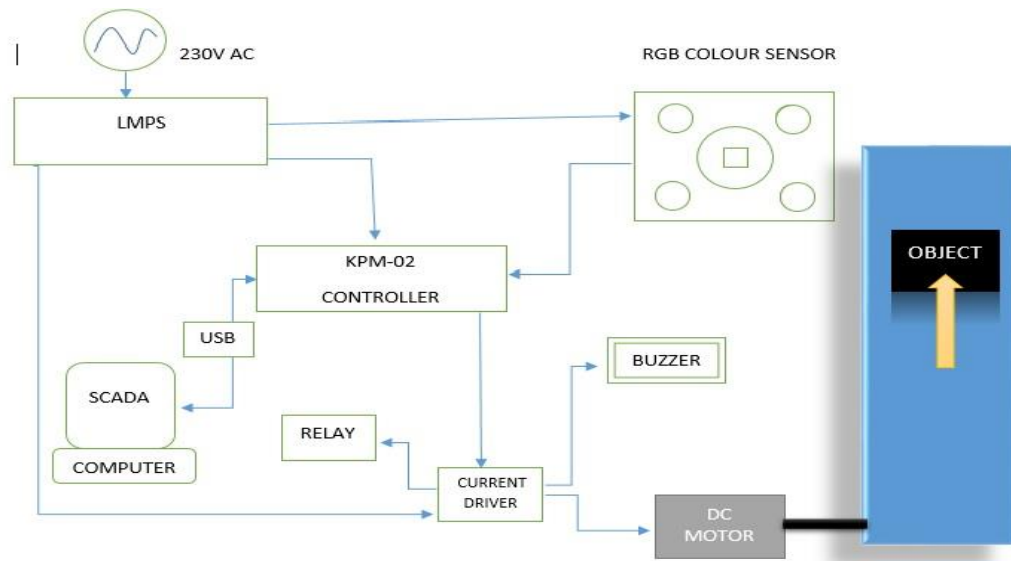


Fig -1: Block Diagram

2.1 Working

First we use the LMPS (Linear Mode Power Supply) to convert electrical power efficiently. The Input to the LMPS is 230 volts. LMPS gives The Output of 12V DC.

The output of LMPS is Given to PLC which is Named as KPM-02 Controller and Current Driver as shown in Figure. There are multiple inputs and output in PLC which can be digital or analog. In this process we use D.C. motor for Rotating the Conveyor Belt. The conveyor belt is shown in figure in blue colour. The DC motor is Driven by the current Driver. The object is placed on the conveyor belt and the conveyor belt is rotated by the DC motor, when the object comes in Front of the RGB colour sensor, the Colour sensor senses the colour of the object and Gives the output to the PLC controller. The colour sensor acts as transducer which converts physical Quantity to electrical quantity. The PLC takes the Input from the RGB colour sensor and processes it. As the object is passed the buzzer makes a sound. Relay is used for Switching. The PLC process the information and the Output is Being Displayed on the Computer with the Help of SCADA (Supervisory Control And Data Aquisition). The data is transferred through the USB (Universal Serial Bus). The SCADA is used to supervise the process and store the data in the form of Database. The Day to Day Record is maintained with the help of SCADA. As shown in figure-1 the Block Diagram is shown. In this way the cycle is repeated.

4. CONCLUSIONS

This prototype will help in object detection and sorting process more efficiently with less time consuming. Also less man power will be required. We have proposed a system which would increase the production rate. we can modify the system according to the requirement.

5. REFERENCES

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