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Inspection of Consumer Products Using Industrial Camera

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Abstract*— In today's modern world, everything has become mechanized. Every task is done by machines, but in the present scenario manual inspection and sorting is more popular with respect to size, color etc. If done manually the process is slow and grading is done by visual inspection that could be error prone. So to improve the speed, efficiency and reduce the error in inspection process we require to mechanize it. In this project we are going to prepare a machine which will inspect the products using machine vision and the operations in image processing. In this machine factors like size, color etc. are taken care by image processing. The proposed work is to develop compact, easy and accurate objects inspection machine using real time color image processing method to continuously evaluate and inspect the color deformity using camera based machine vision .After the evaluation of the quality the object is sorted. In addition to inspection we are also storing the information of the scanned products in the database which will be useful for various activities like traceability of the product, calculating the total number of errors etc.

Keywords*— Camera, Image processing, PLC, VFD, conveyor, Sensor.

I. INTRODUCTION

Color based inspection can be used in many industries for inspection of products as well as for sorting purpose to ensure the quality of product is up to the mark e.g. Food processing industries, pharmaceutical industries, automotive industries, agriculture industries etc. Such process reduces the human efforts, labor cost and also time of operation. Most of the errors caused due to human fatigue are eliminated due to use of automated system supported by inspection using image processing. Also today the availability of human resources is one of the problems faced by the industries. So an efficient system with minimum human intervention was needed to be designed.

In this project we are using an industrial camera which will capture the image of the product. This captured image will be sent to system for processing, after the processing of image appropriate decision will be taken by the system. This decision is taken on the basis of color, fixture and size of the product. The system will tell whether the product is manufactured properly or not. This decision is further given to PLC, which will then sort the product according to decision taken by system. An LED panel will be used to indicate the status of the product. A GREEN light will glow if the product is OK and a RED light will glow if the product is having some faults.

In this project the camera will also scan the barcode sticker on the product. The information in the barcode is scanned and stored in the database. This scanned information will be useful for purpose like tracking of products .We will be able to keep a track of the errors detected. Also a report can be made of all the products found with and without errors. This will be done with the help of VB i.e. Visual Basics. This project has an additional feature of HMI i.e. Human Machine Interface. This will help in easy controlling of the inspection process even after the products to be inspected are changed. Also this system can be easily handled by anybody using HMI.

II. EXISTING SYSTEM

Initially the inspection and sorting procedure was done manually. Humans were employed to test the products using vision. With the increase in quantity of production the human labour needed to be increased.

III. PROPOSED SYSTEM

In this project the finished products which are to be inspected will be continuously moving on a conveyor belt. A photoelectric sensor is placed at a particular point on the conveyor belt. When the product cuts the photoelectric sensor, it triggers the camera mounted on the conveyor belt. After getting this trigger the camera captures the image of the product. This industrial camera captures around 50 full frames per second.

After capturing the images it is processed by the camera itself. The camera is initially programmed using a PC. The camera to PC

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interfacing is done through Ethernet. In PC a special software will be present which will be compatible with the camera .The image processing is done considering parameters like color, size and fixture present in the image. All this parameters are checked and if fulfilled then the product is declared as OK. If any of these parameters are not satisfied then it is regarded as an error and the product is discarded. Also the barcode on the product is scanned and a record is kept for tracing of the product. This decision of the camera is then sent to the PLC. The PLC and camera interfacing is done using Hardwiring. The PLC then glows the GREEN or RED light according to the decision of the PC. Also further the product with any error can be sorted out with the help of PLC.

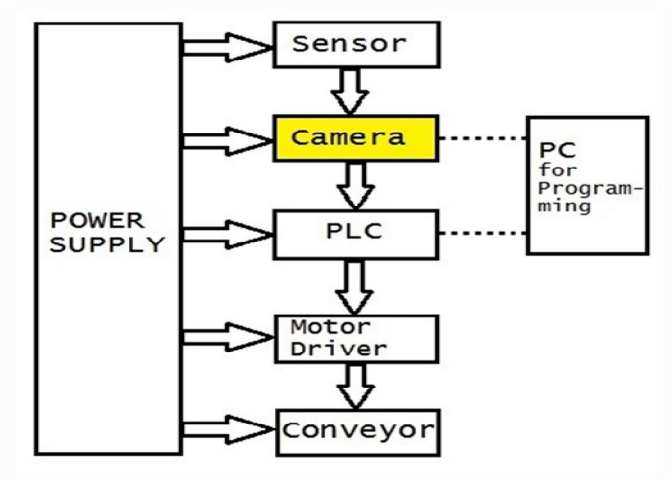

Fig. 1 Block diagram

IV. FLOWCHART

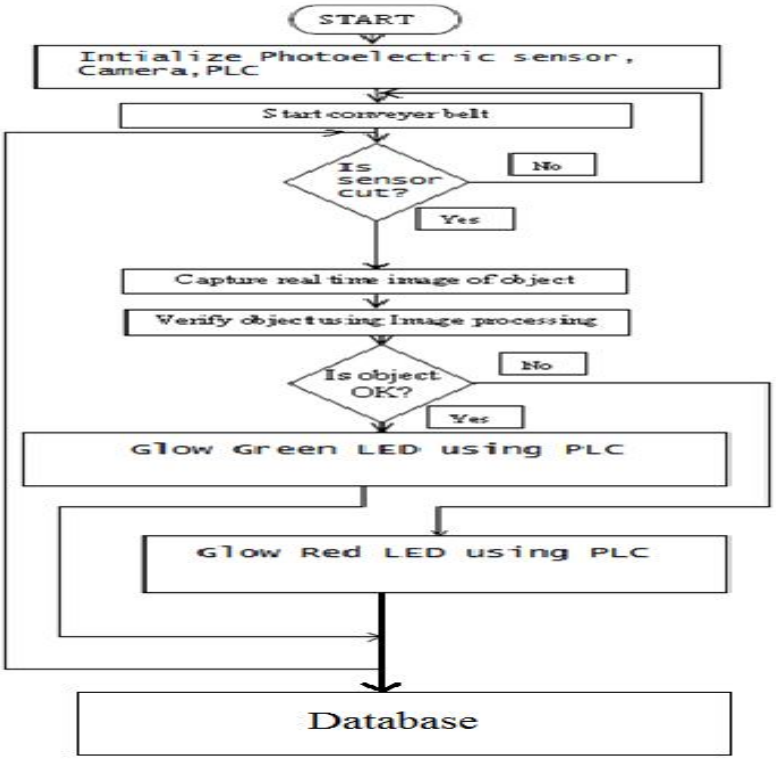

Fig.2. Flowchart

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V. RESULT

The above system is 100% viable. This means that the inspection rate of this system is 100 out of 100.

VI. CONCLUSION

With the concept of image processing the inspection of consumer products can be done. It is practical one and highly feasible according to economic point of view, reliability and accuracy. It is programmable one therefore its database can be updates according to the change in products whenever it is required. This image processing based identification system has been introduced mechanize the whole identification process. The goal of this project is to nullify the errors caused in the identification process effectively. Also this system can be further extended to do the sorting process with the help of PLC.

VII. ACKNOWLEDGEMENT

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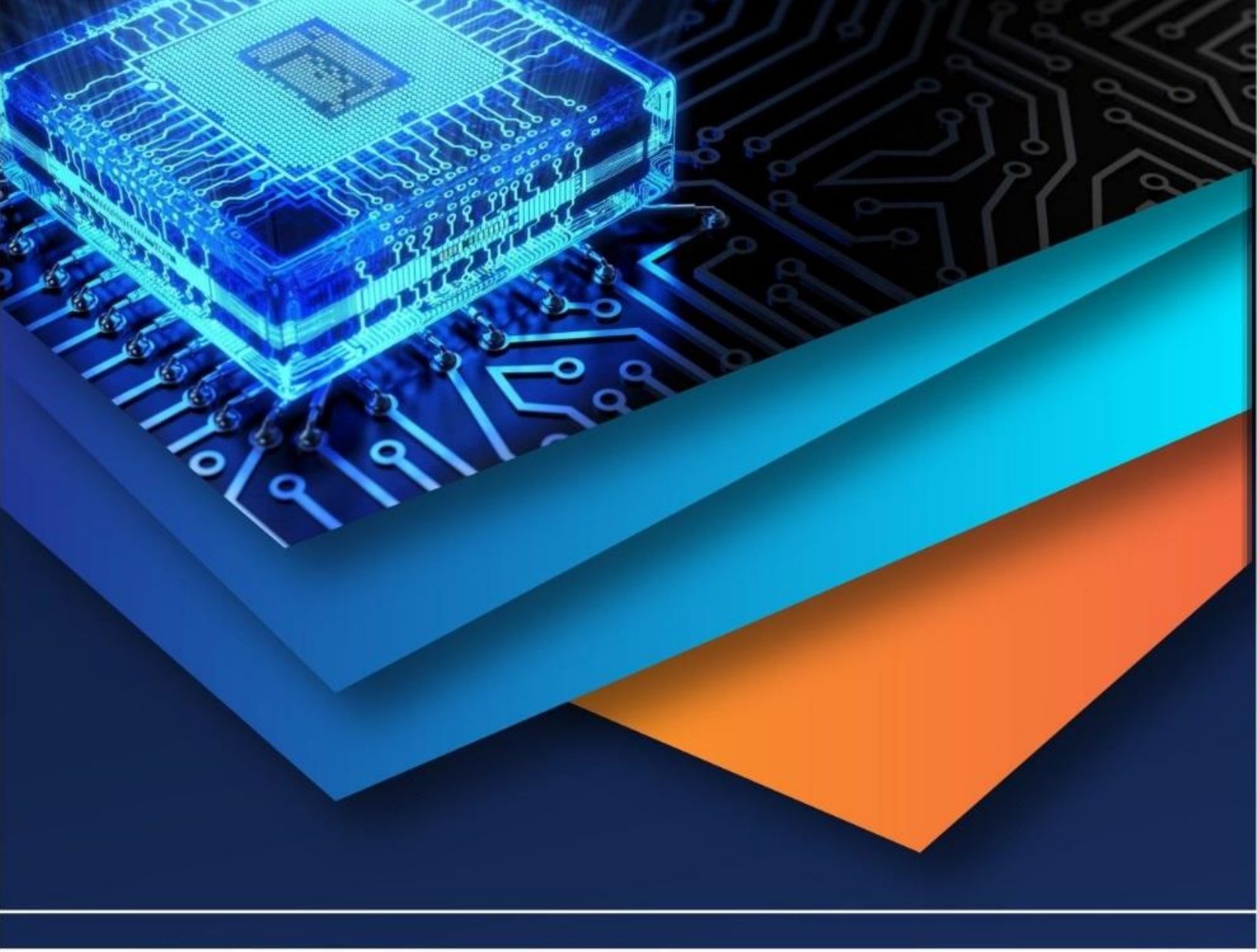

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