Plagiarism Checker X Originality Report

Similarity Found: 57%

Date: Wednesday, April 10, 2019
Statistics: 1358 words Plagiarized / 2379 Total words
Remarks: High Plagiarism Detected - Your Document needs Critical Improvement.

A NOVEL CONVEYOR BELT MECHANISM FOR IDENTIFYING AND SORTING PRODUCTS 1CH.Chandana priya, 2K.Sowmya sree, 3I.Ramyaka, 4 D.Amala, 5K.Radhika 1,2,3,4Final Year, B. Tech, 5Professor 1,2,3,4,5 Electronics and Communications Engineering, 1,2,3,4,5Geethanjali Institute of Science and Technology, Nellore, India Abstract: This paper attempt to design an automation system for package and identification of product color difference.

The products are placed on a moving conveyor belt, a color detecting device will be situated in a position of conveyor belt that detects two different colored products and a divider separates different colored package product to the destination. The passage and separation of the product to the intended destination is done by a color difference mechanism.

In many packaging industries color object sorting and separation is a major task that needs to be done at final dispatch system. Manual sorting is a traditional approach that is preferred by industries. This approach is performed by human operators which is tedious, time-consuming, slow and non consistent.

ATMega 2560 is an on chip microcontroller consists of a powerful CPU tightly coupled with memory. In this project we are going to interface TCS3200 color sensor with microcontroller. TCS3200 is a color sensor which can detect any number of colors with arduino programming.

Therefore, the efforts are made to design and implement an automatic technique of product passage and separation via color difference mechanism. Keywords: Color sensor, AT Mega 2560, Servomotor, product. INTRODUCTION In many packaging

industries color object sorting and separating is a major task that needs to be done at final dispatch system.

Sorting of objects is extensively used in many industries like food processing industries, toy industries, etc to ensure that the quality of the product is up to the mark[1]-[5]. This process is simplified by the use of automation. Automation is the use of control systems like computers or robots for handling different process and machineries to replace a human being and provides mechanical assistance. Automated systems generally use more complex algorithms which increase the cost of the design and the power consumed[6].

This not only reduces manual efforts, time consumed, gives more time for marketing, but also prevents danger which might occur when human beings working hazardous environments. The development of manufacturing industries is dependent upon research in manufacturing process and innovation in new products. During processing, the raw material get transformed into product. Automation greatly improves the productivity and is highly scalable[7].

The main task performed here is to sort the products manufactured in the company. The purpose of this project is to save the time for inspection and to reduce the efforts of the workers in material handling. An automatic sorting machine has main task of sorting components according to the color.

The project involves color identification of an object which is done by Light dependent resistors arrangement acting as a color sensor which identifies the object's color and sends the signal to the ATMEGA microcontroller in Arduino [9]-[13].A sorting machine is more practical and economical method of automation, which transfers material from one point to another.

This also consists of conveyor belt, which reduces the efforts of material handling. Worker fatigue on assembly lines can effect performance of the system, product quality may damage. This project focuses on automatic technique of product identification & separation through color identification.

Machines can perform tedious errands superior to people. II.Proposed Method: This project focuses on automatic technique of product identification & separation through color identification A color detecting device is situated on conveyor belt that will detect two different colors of products during packing process and a divider will separate different colored packaged products to different destination.

DC motors are used to control the conveyor belt and servo motors are used for sorting purpose. The schematic diagram of the proposed system is shown in figure (1). / Figure(1): schematic diagram Microcontroller: AT Mega 2560: The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable.

The ATmega2560 has 256 KB of flash memory for storing code (of which 8 KB is used for the bootloader), 8 KB of SRAM and 4 KB of EEPROM. Each of the 54 digital pins on the Mega can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor of 20-50 k Ohms.

When the Mega2560 is connected to either a computer running Mac OS X or Linux, it resets each time a connection is made to it from software (via USB). For the following half-second or so, the bootloader is running on the Mega2560. While it is programmed to ignore malformed data (i.e. anything besides an upload of new code), it will intercept the first few bytes of data sent to the board after a connection is opened.

If a sketch running on the board receives one-time configuration or other data when it first starts, make sure that the software with which it communicates waits a second after opening the connection and before sending this data. A digital read pin will read the digital value of the given pin similarly digital write pin will write the digital value of given pin.pin mode will set the pin to input output mode. Analog read and write pin reads and writes the value of pin respect.

IR SENSOR: An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor.

Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, that can be detected by an infrared

sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, The resistances and these output voltages, change in proportion to the magnitude of the IR light received.

SERVO MOTOR: A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate and object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servo mechanism. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor.

We can get a very high torque servo motor in a small and light weight packages. Doe to these features they are being used in many applications like toy car, RC helicopters and planes, Robotics, Machine etc. LCD: It is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals.

Liquid crystals do not emit light directly. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images which can be displayed or hidden, such as preset words, digits, and 7- segment displays as in a digital clock. System design and methodology: The flow diagram of the proposed model is as shown in figure (2).

/ Figure(2): Flow diagram of proposed method The proposed system works in following three steps: 1. color sensing 2. sorting mechanism 3. counting of products Color sensing: The color sensor as shown in figure (3) detects primary RGB colors and then checks for reflected color intensities which convert the intensity value into 8 bit value for each primary color. The RED color object reflects RED color with high intensity similarly for GREEN and BLUE.

The three primary RGB colors are mixed to create remaining colors. After knowing fixed values of primary color it is easy to determine the color of tested object. The corresponding light intensity is reflected on sensor, and each color is having a particular value accordingly sensor will produce the output. / Figure (3):color sensing of an object. Sorting mechanism: For the separation of product, a divider was used that was directly attached to a servo motor.

The divider of movement of the product was run by a servo motor. The divider is like linear actuator. Servo motor can rotate 180 degrees. So it was kept on 90 degrees position and the program was written as it moves anticlockwise for red-colored products and clockwise for green colored ones. Every time it divides the movement of

products, it returns to its 90 degrees position after a 2-second delay.

The schematic view of the arrangement of the separating system with a servo motor and a divider attached to it are shown in following Figure (4). / Figure (4): Sorting of two objects. Counting of products: Detecting and counting of products in the machine ensures the continuous monitoring product flow as shown in figure (5).

The entry and exit of products is optimized and missing product in the conveyor belt reliably are detected. The reliable detection of products is guaranteed with IR pairs. / Figure (5): counting of products. III. Results and discussion: In this project, color of an object is sensed by color sensor and sorting of the objects is done by servo motor taking into consideration three colors namely green, red ,blue(RGB). / Figure(6): color sensing and sorting of objects.

As shown in the figure (6), the AC power supply is converted to the DC power supply by rectifier ,this power supply is maintained by the transformer and it is given to the Arduino microcontroller.Here the object is placed on the conveyer belt ,which is rotating in clockwise direction with the help of DC motor.The color of the object is sensed by the color sensor which is placed on the conveyer belt.The object is sorted by the servo motor and placed in their respective destinations .

The counting of the products based on value of color is realized by IR sensor pair and it is programmed using arduino software is shown in figure (7). / Figure(7):Counting of products VIII. Conclusion and Futurescope: As the world is getting modern and digitalized, human labor is being replaced by technologies and intelligence for bringing higher comfort in human life and also for saving time and precise operation and mass production.

In small and large scale industries to sort the products based on the various parameters or in food industries to identify the rotten or damaged fruits, this system of product separation based on color is essential for quick, accurate operation and mass production than using traditional human labor. Not only for bringing comfort but also for improving product quality and reducing cost.

The system is more improved and modified and very much essential in Practical life and Industrial activities.Color sensing and sorting is very useful in wide varieties of industries 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. 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.

The implementation in this project are,We can add a load cell for measurement and control of weight of the product, Speed of the system can be increased accounting to the speed of production, the system can be used as a quality controller by adding more sensors,the sensor can be changed according to the type of product that means the DC motor can be replaced with stepper motor. References [1]C.Zhangand, K.S.Suslick,?? Colorimetric sensor array for soft drink analysis??, J.

Agric Food Chem, vol 55, pp 237-242,2007. [2] P. D. Oram and J. Strine,??Color measurement of a solid active pharmaceutical ingredient as an aid to identifying key process parameters??, J. Pharm Biomed Anal, vol 40, pp 1021-1024, 2006.Author, Title of the Book, Publisher, (200X), [3] M.

Frank, Nobert Kaiser, Wolfgang Buss, Ramona Eberhardt, ??High-speed industrial color and position sensors??, Electronic Imaging??99, pp 50-57, 1999. [4] A. Pacquit, J. Frisby, Danny Diamond, King Tong Lau, Alan Farrell, Brid Quilty, Dermot Diamond, ??Development of a smart packaging for the monitoring of fish spoilage??, Food Chem, vol 102, pp 466-470, 2007. [5] E. J. Cadieux Jr, ??System and method for visually inspecting a cigarette packaging process??, ed: Google Patents, 2002. [6] D.J.

Lee and R. S. Anbalagan, ??High-speed automated color sorting vision system??, in Optical Engineering Midwest??95, pp573-579, 1995. [7] J. V. Popov-Ralji,et al, ??Investigations of bread production with postponed staling applying instrumental measurements ofbread crumb color??, Sensors, vol 9, pp 8613- 8623, 2009. [8] J. V. Popov-Ralji and J. G.

Lalii-Petronijevi, ??Sensory properties and color measurements of dietary chocolates with different compositions during storage for up to 360 days??, Sensors, vol 9, pp 1996-2016, 2009. [9] A. Semenchenko, M. Stadnik, P. Belitsky, D. Semenchenko, and O. Stepanenko, " The impact of an uneven loading of a belt conveyor on the loading of drive motors and energy consumption in transportation", Eastern-European Journal of Enterprise Technologies, vol. 4, no. 1 (82), 2016. [10] FLEXChip Signal Processor (MC68175/D), Motorola, 1996.

[11] "PDCA12-70 data sheet," Opto Speed SA, Mezzovico, Switzerland. [12] A. Kondhare, G. Singh, N. Hiralkar, and M. S. Vanjale, "Colour and shape based object sorting", IJSAE Journal, vol. 2, Issue 3, pp. 553 – 562, 2014. [13] M. S. Telgote and G. S. Sable, "Object

sorting system in MATLAB using robotic arm", IJSEI Journal, ISSN: 2251-8843, vol. 2, Issue 22, November 2013.

INTERNET SOURCES:

3% - https://www.mouser.com/catalog/specsheets/ArduinoBoardMega2560.pdf
1% -
https://www.fecegypt.com/uploads/dataSheet/1522237550_arduino%20uno%20r3.pdf
2% -
http://www.authorstream.com/Presentation/agarwal3-2641088-infrared-ir-sensor-circuit-diagram-working-principle/
1% -
https://www.slideshare.net/agarwal3/infrared-ir-sensor-circuit-diagram-and-working-principle
2% - http://iosrjournals.org/iosr-jeee/Papers/Conf.17017/Volume-3/13.%2082-87.pdf
1% -
https://www.scribd.com/presentation/288007761/Infrared-IR-Sensor-Circuit-Diagram-and-Working-Principle
1% - https://ecdtumeshshirale.blogspot.com/2017/09/
1% - http://www.loewenfanclub-kasing.de/servo-motor-diagram.html
2% - https://www.hackster.io/taifur/complete-motor-guide-for-robotics-05d998
1% - https://www.youtube.com/watch?v=B6JYxrCIAkU
2% - https://en.wikipedia.org/wiki/Liquid_crystal_display
<1% -
https://www.academia.edu/35880198/Development_and_Implementation_of_Microcontroller-based_Improved_Digital_Timer_and_Alarm_System
1% - https://www.irjet.net/archives/V4/i10/IRJET-V4I10180.pdf
<1% - https://www.pepperl-fuchs.com/global/en/24854.htm
<1% -
https://www.electronicslovers.com/2018/10/arduino-based-automated-waste-segregator-final-year-project.html
<1% - http://www.irisprojects.com/ieee-2017-2018-project-titles-consumer-electronics/
2% - https://www.ijraset.com/fileserve.php?FID=8588
1% -
https://www.tradeindia.com/Seller-344898-ORANGE-SORTING-MACHINES-INDIA-PRIVATE-LIMITED/
<1% - https://www.cleverism.com/major-approaches-models-of-change-management/
1% - http://www.ijraset.com/fileserve.php?FID=8588
3% -
http://journals.saintgits.org/paper-submission/uploads/paper_details/14-08-15_70.docx
1% -
https://www.researchgate.net/publication/281659985_Design_and_Characterization_of_Automated_Color_Sensors_System
1% - https://link.springer.com/article/10.1007/s12247-011-9115-5
1% - http://www.journalofbiomaterials.org/article/539/10.11648.j.jb.20180201.13

1% - https://mafiadoc.com/design-and-characterization-of-automated-color-sensors-system_598d30161723ddcc692f0592.html
1% - https://www.mdpi.com/1424-8220/9/3/1996/pdf
<1% - http://www.iosrjournals.org/iosr-jce/pages/v11i1.html
<1% - http://www.iosrjen.org/Papers/Conf.ICIATE-2018/Volume-4/11-43-46.pdf