Research Paper Engineering

Object Sorting Using Image Proccesing in Raspberry Pi 2

Ramkar Krunal J PG Student, EC Department, Venus International College of Technology, Gandhinagar

Prof. Aniruddh Amin Head of Department, EC Department, Venus International College of Technology, Gandhinagar

ABSTRACT

The aim of this project is to present a method for object detection based on its colour and shape information The project mainly focuses on the basis to implement the object detection and selection based on its color, which is a visual based project i.e. the input to the project will be the video/image data which is continuously captured with the help of a webcam which is interfaced to the Raspberry Pi. It will detect the object and it tracks that object by moving the camera in the direction of the detected object. Here we use Raspberry Pi 2 board to do image processing for detection of shape and color information an object. after sorting object ,sorted object is selection done from mobile webpage in LAN/WAN by using raspberry pi and selected object will dropped into second conveyor belt comes out. So in this system we can sort object and also select that sorted object from webpage in LAN/WAN.

KEYWORDS : Raspberry Pi 2, Shape/Color Detection, Canny Edge Detection, OpenCV

Introduction

The aim of this project is to present a method for object detection, sorting, and selection based on its colour. System has Raspberry Pi Arm-7 based processor board to do image processing for detection of shape and colour information an object. The main features of Raspberry Pi are Broadcom BCM2836 Arm-7 quad core processor (900 MHz), 1GB RAM, on board USB 2.0 ports. Providing a wide range of processors based on a common architecture that delivers high performance and cost efficiency [1].

The objective is to detect an object based on colour and the make use of open source hardware, hence Raspberry Pi processor board is the best option for an individual interested in low cost Arm processor. It has many inbuilt features and many ports which makes the used to experience the power of using a processor. The board comes with USB ports to which Camera, keyboard and mouse, Wi-Fi dongle can be connected which gives the feeling of working on a system[3].After sorting object we can select that sorted object by LAN/WAN network by using a webpage on browser in mobile, pc, tablet.

Proposed Work

The main aim of the system is to increase the accuracy for sorting objects according to the manufacturer's need. The objective can be summarized as below:

An IMAGE needs to be given as input to the system. The image will contain, object on the conveyor belt. The camera should be placed at the top, so as top view of the objects is captured in the image. The images should be classified as per the parameter selected by the user and statistics of the number of objects should be displayed.

System Design and Methodology

The proposed system works in following three steps:

- Image Acquisition
- Image Processing
- Sorting Mechanism
- Sorted Object Selection

Proposed Tools to be used

Hardware requirements

- Raspberry Pi 2
- Stepper motor
- Webcam
- DC motors
- Conveyor Belt
- Power Supply
- Wi-Fi Dongle

Software requirements

- Open CV
- Raspbian OS
- Development tool for webpage like Apache web server, HTML, CSS3

Fig.1 Block Diagram

Industry is having existing applications which are mostly based on Sobel edge detection mechanism. Moreover, users have to pay higher license fee. In image processing, there is always some space to improve the performance. Therefore, the application could be used for better performance with probably lower commercial price.

Algorithm:

COLOR DETECTION ALGORITHM

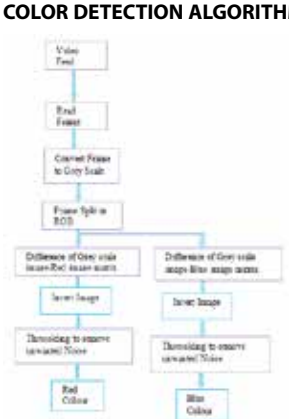

Fig. 2 Color Detection [1]

Read the image captured by the Camera. RGB frame conert into grey

sale image.than again take RGB image and convert into R,G,B matrixs. than take difference of grey scale image and R matrix.so we get only G and B part in Image now invert whole image and than thresholding that image to remove noise from image.

SHAPE DETECTION ALGORITHM

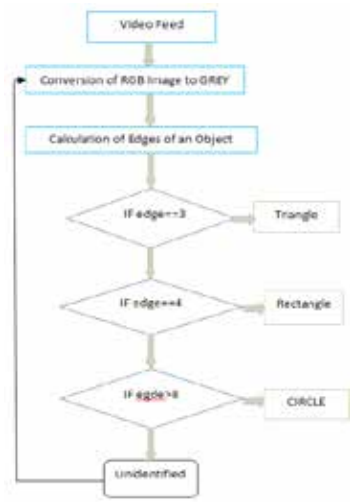

Fig. 3 Shape Detection[1]

I use edge detection and corner detection methods for detect shape detection but I found that edge detection is much better Since edge detection is in the forefront of image processing for object detection, it is crucial to have a good understanding of edge detection algorithms. An edge is the boundary between an object and the background, and indicates the boundary between overlapping objects.

Object Detection :

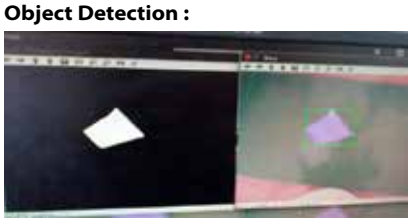

Fig. 4 Rectangle Blue Color Detection

Fig. 5 Blue-Red Objects

Fig. 6 Red Color Detection

Object Selection From Webpage
Website Development Tools

In This Paper, it is aimed to develop a user–friendly, web–based, cheap, effective and small sized webpage system which can be controlled and modified by the users. Webpage interface gives the opportunity to users, to control device which can access to Internet. This design brings practical solutions to digital world. Simple web browsers can open this webpage.

Apache Web Server

Apache HTTP Web Server is a web server in basic manner . On our cloud server we have LAMP stack. So we're using Apache as web server for our project. Also Apache supports a variety of features many of which implemented as compiled modules which extend the core functionality. These can range from server–side programming language support to authentication schemes[4].

CSS3

CSS3 is used in this study to customize the front–end. CSS; in other words Cascading Style Sheet defines how to display HTML elements . Cascading Style Sheets customize fonts, colours, margins, lines, height, width, background images, advanced positions and many other things.

HTML5

HTML, in other words Hyper Text Markup Language, is a programming language for describing web sites. HTML5 is used in this project because Twitter Bootstrap theme supports HTML5 . This language also brings practical solutions to development process[4].

After sorting object by its color and shape sorted object is collected by box and than after this object is selected from web page by its color and shape.

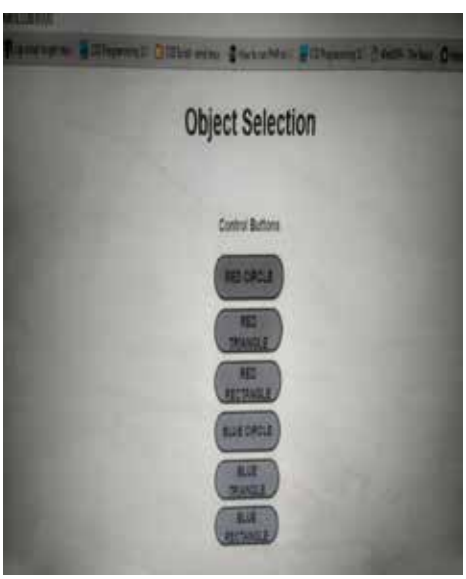

Fig.7 Object Selection from Webpage

Thus, object selection is done by means of webpage using HTML5, CSS3, Apache server. The figure 7 shows screenshot of the webpage.

CONCLUSION

This Project for detecting the objects and also for classifying the objects is successfully implemented and selection of sorted object from webpage is also done. In this research mainly focus on the shapes and colors of the objects for detecting and classifying with using image processing. In future, it can be further continued for detecting the objects based on the more color, more shape deformation.

REFERENCES

[1] Vishnu R. Kale, V. A. Kulkarni "Object Sorting System Using Robotic Arm" International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 2, Issue 7, July 2013.

[2] Guobo Xie and Wen Lu "Image Edge Detection Based On Opencv" International Journal of Electronics and Electrical Engineering Vol. 1, No. 2, June 2013.

[3] Vijayalaxmi, K.Anjali, B.Srujana P.Rohith Kumar "Object Detection And Tracking Using Image Processing" Global Journal of Advanced Engineering Technologies.

[4] Design And Implementation Of Remotely Managed Embedded Digital Signage System Taner Arsan, Alp Parkan and Hakkı Konu International Journal of Computer Science, Engineering and Applications (IJCSEA) Vol.4, No.3,June 2014.

[5] Madhura Sulgekar, Swapnesh Wani, Ketki Joshi, Akshay Dagade "Object Shape Detection Using ARM 11 and Embedded Linux SM's International E-Journal on Ongoing Research in Management and IT E-ISSN-2320-0065.