

Application For Real Time Object Measurement

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Abstract: As we are moving forward into high tech world , there is change in the traditional method which we use . To measure the dimensions of an object we traditionally use scale or any other measuring gadgets .Its time consuming job as well as there are high chances of human error . Hence we are implementing this project to remove these drawbacks and measure the object in real time without human intervention. This will give us less error and more accuracy .we have used a simple algo to implement this project as well as a web cam which is an one time investment . Also we have used technologies like numpy, opencv, etc.

Keywords: OpenCV, Image segmentation, Edge Detection, Thresholding, Aruko Marker.

I. INTRODUCTION

Since the development of AI and IOT in the field of industrialisation we are more keen on mechanization and quick working. Real time object measurement states that we get the measurements of the object on screen as we are watching the image in real time . Recognition of the object and its edges assumes a significant part in detecting the object . Edge Detection is the significant stage in image processing and handling, Computer vision etc. .There are quite a large number of techniques to distinguish an object and its edges. Edge Detection, which is the main field in the field of Computer vision, is an approach to handle an image to decide the boundaries of an object . In this project we are making use of one of the methods which we have used to identify an object and to take its estimation in a metric unit framework .We used thresholding technique which is used for exact edge recognition of the object .

One of the main advantage of this methodology is that ,it will reduce our job and hassle of measuring the object accurately. You simply use a webcam to know the measurements of object in a matter of seconds. All you have to do is place your object on white paper along with aruko marker.

II. ADVANTAGES AND DISADVANTAGES

Advantages:

- It reduces human error and increases efficiency.
- Easy to use.
- Inexpensive as just a webcam required.

Disadvantages:

- White background, the only requisite.

III. FEATURES OF PROJECT

- A more convenient way for object detection
- Less human error
- Better accuracy
- Simple implementation
- Cost Efficient
- Better future scope
- Easy to use
- Less time consuming

IV. PLATFORM OR TECHNOLOGY USED

Numpy

- It's a library in python language .
- Numpy is used for performing mathematical calculation.

OpenCV

- A library mainly focused at real time computer vision, image processing and machine learning[10]
- OpenCV has different functionalities and applications thus making it flexible.

IOT Device: A Webcam

- A device to capture video and images in real time.

PyCharm

- An IDE (Integrated Development Environment) used for developing python projects .
- Easy to install Libraries
- Supports all frameworks
- Easy to use for developing python project

V. IMAGE SEGMENTATION

In digital world of computer vision and image processing ,image segmentation plays one of the most important role .Its a process of splitting an digital image into numbers of image segments , also called image object ,image regions.Image segments are nothing but set of pixels .The aim of segmentation is to make it easier to analyze the image and get meaningful information out of it. It is widely used to detect object and its edges .Its basically labeling pixel of image so as that same label pixels have similar characteristics[8].

Thresholding:

Amongst all the image segmentation techniques we are using threshold technique as it is simple, fast and effective[3]. Its based totally on threshold value which is used for converting greyscale picture into binary picture. The key component of thresholding is the threshold value.

Steps :

- Convert RGB image to grayscale image
- Convert grayscale image to Binary image using Threshold value

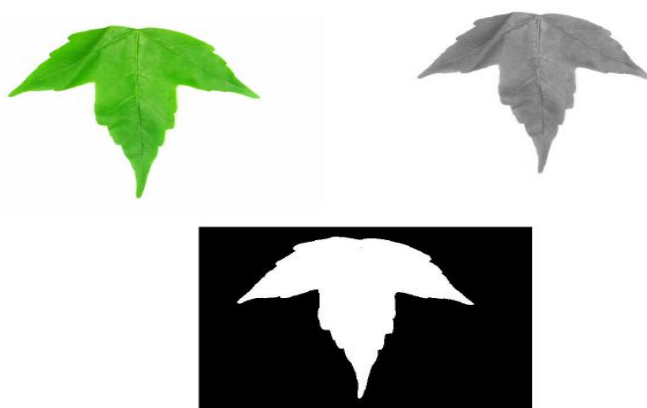


Fig. 1 RGB to binary conversion.

VI. ARUCO MARKER

An Aruco Markers [12][13] is a binary square trustful marker that is used for camera pose evaluation. It is consisted of a wide black boundary and an internal binary matrix that is primarily used to find out its identifier. The black boundary makes it more simple for the brisk detection in the image and the binary code lets the recognition and implementation of error detection and correction approaches. The marker can be in various sizes and different dimensions. The size of the marker chooses the size of the internal lattice. For example, a marker of size 5x5 is composed by 25 bits. Using it we find the pixel measurement of the image and later convert it to centimetre using the conversion ratio.

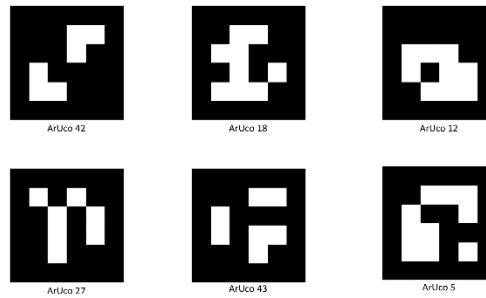


Fig. 2 Aruko Marker.

VII. SYSTEM ARCHITECTURE

This is the system architecture of project .

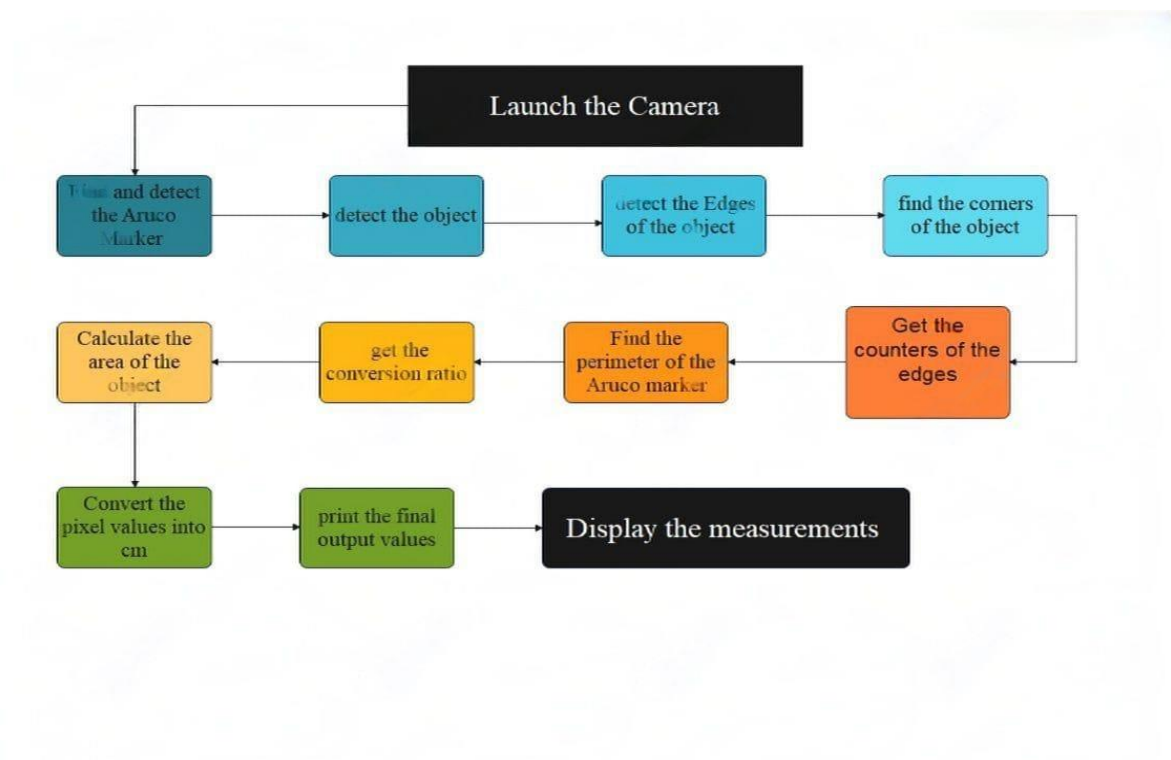


Fig. 3 System Architecture

VIII. EXPERIMENTAL RESULT AND ANALYSIS

These are the snapshots of our project where the object is kept on white background and Aruko marker beside



Fig. 4

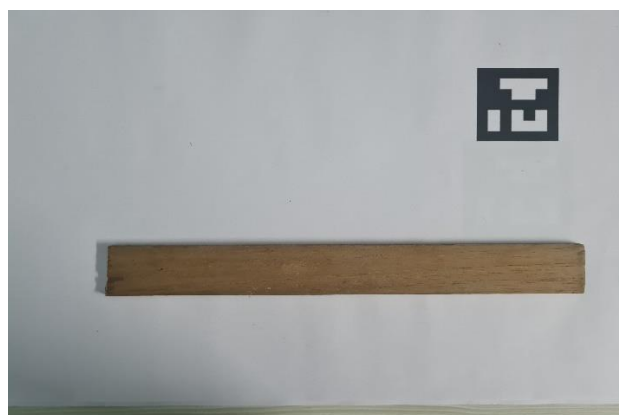


Fig. 5

And this is how it looks after camera captures the image and then shows the measurement along with the image.

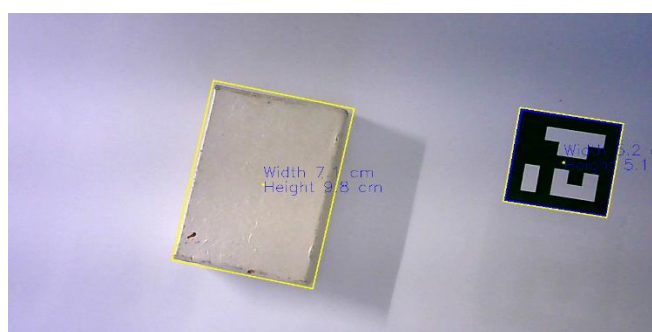


Fig. 6



Fig. 7

IX. CONCLUSION

As a result of our system countless upgrades can be made to the digital world. Thus our project will be capable of calculating the measurements in real time. Devices like the webcam and the binary codification was used in calculating the measurements. Some of the threshold based techniques like the Adaptive Thresholding has been used to find out the dimensions. This technique was implemented as it accommodates many advantages and characteristics and it works faster.

X. FUTURE SCOPE

Machines are used in all aspects of human life. Nowadays we work in accordance with the machines. In recent times the sprint to glide high is massive. Thus, machines and its parts are very essential. The machine cant work properly unless and until the parts fit well. The dimensions of the object make a huge influence. Our AI IOT project will be able to measure the dimensions of an object in real time. A very favourable and simple to use system focuses in giving precision and assurance of the product. As it is one time expenditure it has a significant future scope.

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