Real Time Object Dimension Measurement

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1 PUBLICATION   **3** CITATIONS

Industrial Engineering Journal

Volume 15 Issue 12 * December 2022

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Abstract

Real-time object dimension measurement is very important aspect in the technology industry revolution. It is a very technical, scientific and challenging problem in area of computer vision. Everyday, Engineers and scientists are working hard for making machines to learn, understand by using machine learning and deep learning algorithms so that they can perform tasks more efficiently than humans. It is possible for humans to perform tasks efficiently and accurately by practicing and remember it for next time. It is easy for humans to process and analyze objects easily. This study shows a technique for measuring and calculating the real time dimension from webcam. So, the goal is to achieve ”real-time dimension measurement of the object”.

In this research paper, we are putting forward a method to measure the dimension of Real time object using a Webcam, libraries of OpenCV(Open Computer Vision) and machine learning algorithms.

Keywords: Real time Object dimension measurement, OpenCv, Algorithm.

1. Introduction

As the title states itself the method is used to measure the real time dimension of a real time object. It is a very hot and trending topic in the field of computer science. The working of the method is as follows, first we need a webcam or any other device which can capture image with a white and clean background , then the camera captures the image and the algorithms measure the size of the object, after that the output will be saved on the local storage and display the result on the screen. This method uses the OpenCv libraries. This method can be used in industries for the measurement of the end products during a chemical, physical or other dynamic process, it simplifies human work. The accurate measurement can improve the decision-making process and it can also help to detect and analyze the changes over time. We are proposing a methodology so that we can use a reference object and we will train the algorithm with the dimension of the reference object, and this method will help us to know the dimension of other objects, no matter how far away the object is.

In this method we use an IOT webcam & white background for descry the object. Following that it displays the dimension of the object at real time. For calculating the dimension we need to settle a reference point at the centre of the white background.

2. Literature Review

Right away, some studies single-handedly performed associated to computer vision and introduced their papers contributing to the topic.

Joseph Redmon presented the "YOLO" algorithm that helps to descry the object dimension in real time and also helps for image processing based on CNN. This algorithm is easy to implement and very efficient. YOLO algorithm is very famous for its incredible performance. [3]

M. Naveen Kumar introduced the connection point of OpenCV which is elicited from Java, Python & MATLAB. His study is elicited from a "CUDA" based Graphics Processing Unit(GPU) Interface. Currently this study initiate Robotic techniques of OpenCV. [4]

Santiago Royo had presented an Imaging System that works on 2-Dimensional and 3-Dimensional Environment and it is known as LiDAR Imaging System. For autonomous vehicles, his studies had introduced many arrangements of LiDAR System. The main purpose of this method is to enhance detector arrays, imaging techniques and scanners. [5]

Zaarane Abdelmoghit had worked on different ways of Real-time Object descry. He smartly used the technique which uses stereo camera. The method descry the distance of the object from the camera. [6]

3. Methods

General Workflow
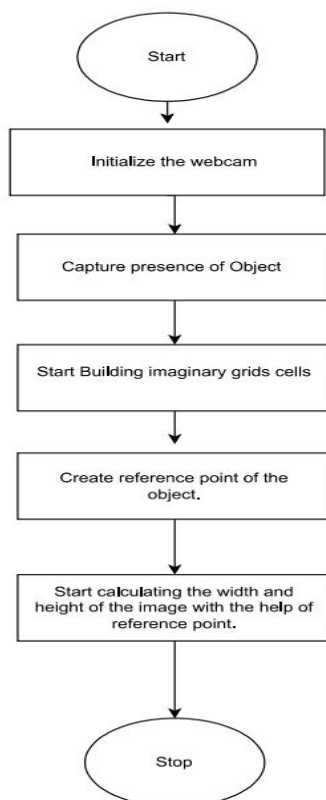
1. Capture Frame

Here it varifies the presence of the object, for capturing the frame we use a camera or webcam that can connect to IOT devices. Multiple images has been captured by the web came and the object detection has been done with the help of various methods such as R-CNN, Single-Shot Multifood Detector (SSD) and Retina Net. YOLO algorithm can also be used for object detection, this algorithm gain popularity by its high performance.

2. Object Identification and Measurement

An object can be anything like human, tree, bottle, car etc. Now we will divide the image into N numbers of boxes or grids and will create a boundary at the boundary boxes and visualize. After creating the bounding, it locates the reference point which is in the centre of the object. After that , calculate the distance between reference point and the boundary, it will give you the dimension of the object in width and length but on X- axis and Y-axis , now double this length and width for the proper dimensions.

3. Save the output

The result will be stored on the local computer.

4. Display the result:

The result will be displayed on the screen.

Many improvements can be made with other algorithms and by industrial advancements. The model successfully measure the dimension of the object. Hence, the OpenCV technology can be used to measure the object dimensions.

Steps for implementing the proposed method:

Download the requirements OpenCv and Numpy. Import OpenCv as cv2 and Numpy as np.

Compose a code such that it can be used to let the IOT webcam ON or OFF. ("webcam=False").

Record the object's video. Assign the dimensions breadth, length and other dimensions.

Gathered setting's code is required.

```
webcam=True
 path='1.jpeg'
cap=cv2.VideoCapture(0)
cap.set(10,160)
cap.set(3,1920)
cap.set(4,1080)
scale=3
wP=210*scale
 hP=297*scale
```

Now the setting are completed. Start composing the code for descrying the object in the image.

Composing a python file to detect and track object in the image and apply methods, to descry the dimension of the object.

From the information image, make a canny picture. Apply enlargement and corrosion features includes with the goal of making the canny picture smooth.

Writing down the program for finding the imperative of the white background that is square in shape.

Enforce filter of square shape because the background is also of square shape concluding the counters and adding the lengthiness and extent. Consequently define the location of the white background.

Enforcing mathematical & scientific ideas and with the assistance of a watchful picture estimate the dimension of the item situated on the white background.

Enforcing an pointer line and set text to show the assessed estimation of the item.

4. Modules description

VSCode

We used VScode as the IDE(Integrated development Environment) , it supports all Python and OpenCV libraries. It is an open source platform and very easy to use.

Python

Pyhton is an interpreted, object oriented, high level programming language, it has many in built libraries and modules. It is very easy to understand. Python is a very pouplar language for web application development and data science.

Numpy

Numpy is a very popular python library which stands for numerical python, it is used for array operations, mathematical and scientific computation.

OpenCv

It's a free open source computer vision and machine learning library, OpenCv is used to provide a common structure for computer vision processes. This library consist of 2500 optimized algorithms, these algorithms can be used for many image processing applications like, face recognition, object detection, security cameras, etc. This library is vastly used by many tech giants, scientists, students and also by government agencies.

IOT webcam

An IOT webcam is a device with multiple applications. Web came with a good pixel reading capability is perfect. Webcam drivers are supposed to be installed, up-to date and work well during the execution of the code.
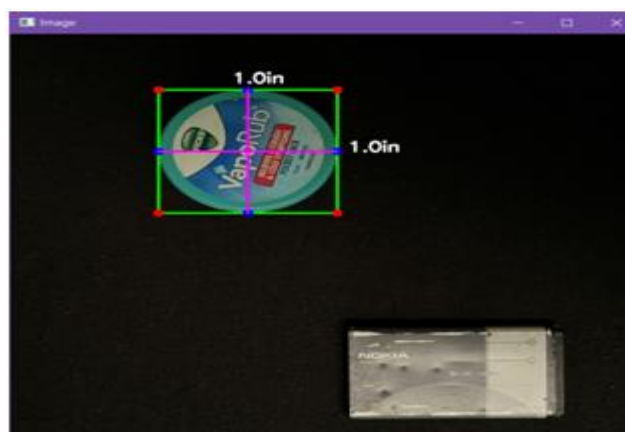
5. Results

The Webcam captures the frame from the video and then perform the object dimension measurement.

Fig1: The image capture by the camera before measurement.
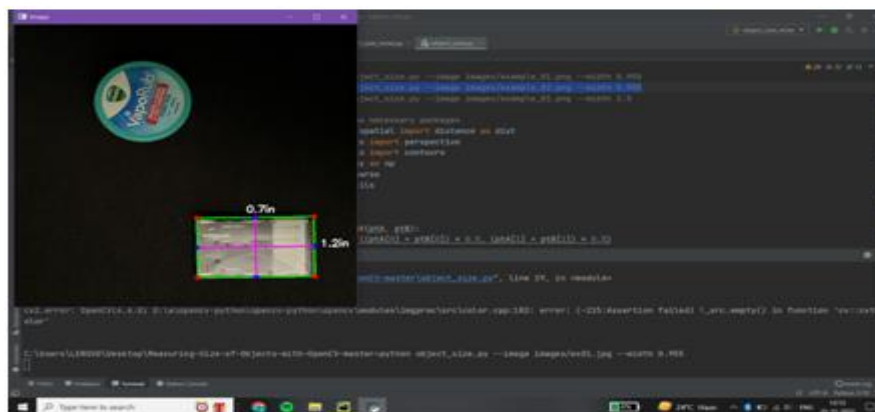
Fig2: After calculating the dimensions of the object.

Fig3: After calculating the dimensions of the object

6. Discussion

As the result shown in the above picture the system works perfectly, it sucessfully descry the dimension of the object situated in the image in real time. This technology can be use to measure the dimension of the object, first it captures the image and then measure the dimension of the object and display the output. This method has many use in the real world scenario.

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