MEASURE OBJECT FROM VIDEO

Computer vision project

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Objective:

Our objective is to find measurements of objects inside a video

Strategy:

We try to use a reference in our video in which we can calculate any object using that reference, the easiest reference we can use is a universal one, so we decide to use an A4 paper as its measurements are perfect

Reading video or use Realtime camera:

Using video or a camera won't differ in this project due to the fact that both are read with the same function and during the code and we use frame by frame to detect object and measure it therefore using either won't differ in output nor implementation although Video is preferred due to convenience in capturing desired effect

Detecting shape of object:

Before measuring an object first we have to detect it, so

For each frame in the video, we take we pass it through a gray filter and gaussian filter so that we can pass it through an edge detector, although any detector can be used it is preferred to use Canny as it is the most optimal edge detector then we dilate and erode the edge

Detected image to remove bad edges and focus more on edges that will be used during contouring process.

The difference between canny and eroded and dilated canny:
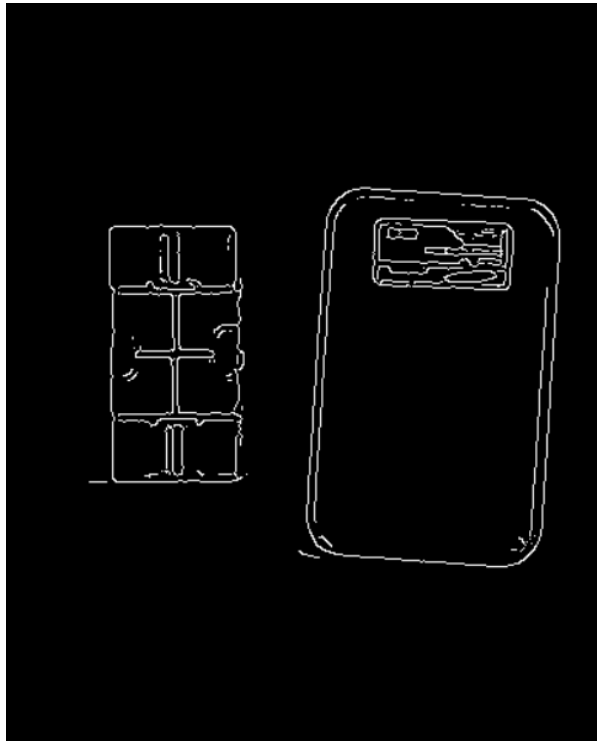
Regular canny   Eroded and Dilated canny
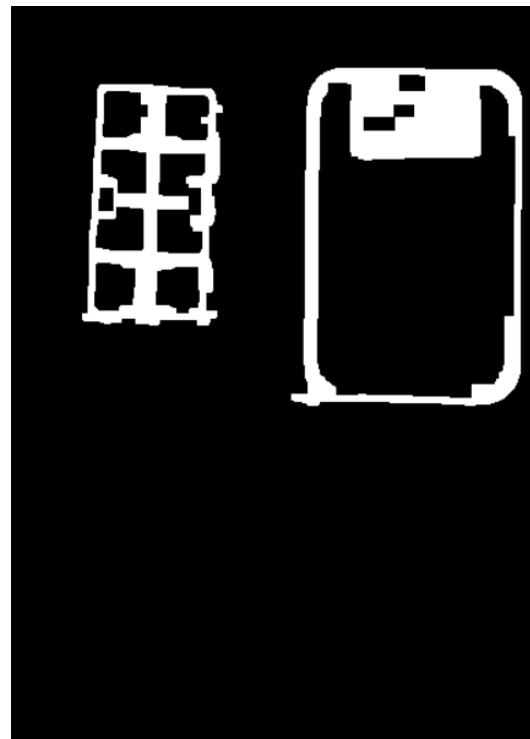
Contours:

      Contours are curves that is joining all continuous points along the boundary also they are a useful tool for shape analyses and In our case object detection.

Getting contours:

We get contours using a function in opencv and specify we only need the outer edges that are gonna be used in measurements.

Then we filter the contours out if their area is lower than the minimum threshold, after that we get the contour parameter to get an approximation of the contours curve so that we can calculate the bounding rectangle of the contour, after that we filter out objects that don't have a rectangular or a square shape

Using A4 as a reference:

After we get the final contour list, we sort them by biggest contour to smallest contour so that we can acquire our reference which is the A4 paper, by getting the contours of the A4 paper with its measurements known we can warp the image so that anything inside the A4 paper can be measured approximately accurate by making each pixel in the warped images a measuring unit where the width of the image is the width of the A4 paper and the same with the height . Then we repeat the contouring process again to obtain the shapes of our objects

Measuring objects:

After getting the shapes of the objects we can use the warped measuring property to measure the distance between two points in the image, to get the measurements of objects in each frame, then we draw lines on the edges of each object and put a text above the lines that shows width/height of each line

The final product:

While the measurements may seem skewed off a little that's due to the video in which experimented on was shaky so that it led to such skewness
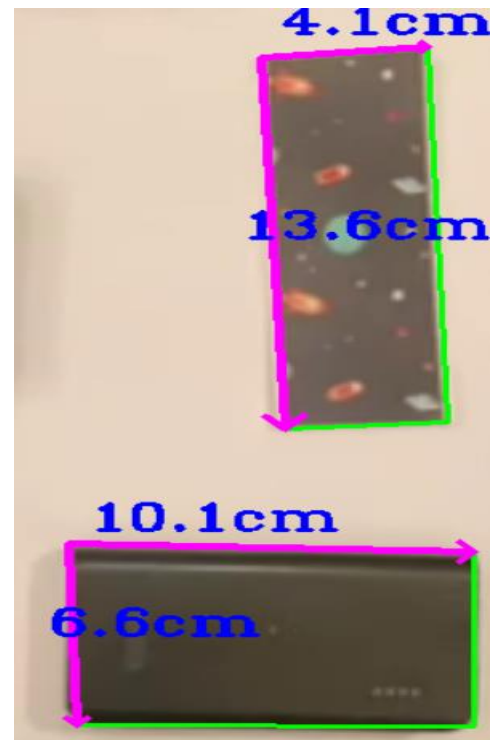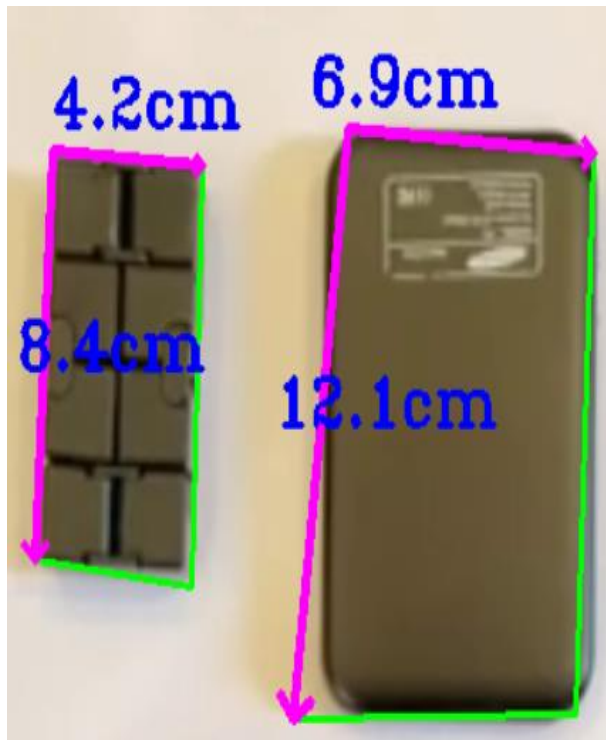
References:

1. www.geeksforgeeks.org
2. www.stackoverflow.com
3. www.computervision.zone