

Project 3: Real-time 2-D Object Recognition

Vinesh Krishna Anne

Abstract: The project is to detect and recognize objects with a camera as an overhead camera with light background (Preferably white).

Task 1: Threshold

The video is processed to blurred and gray scaled such that the background is in black and the objects are in white colored pixels to improve accuracy.

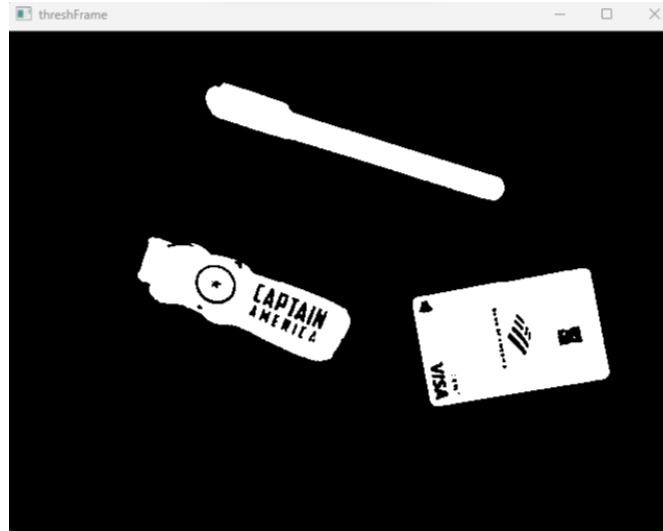


Figure 1: Thresholded Frame

Task 2: Cleanup

After thresholding, the input is cleaned-up using a morphological filter (MORPH_CLOSE) such that the dilation followed by erosion takes place, which is useful in closing small holes spotted inside the object.

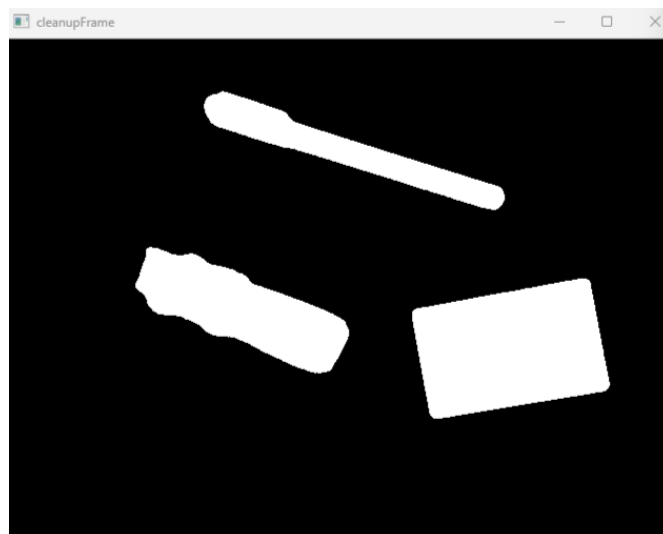


Figure 2: Cleaned Up Frame

Task 3: Regions

The binary image is run to display with large regions and ignored with small regions.

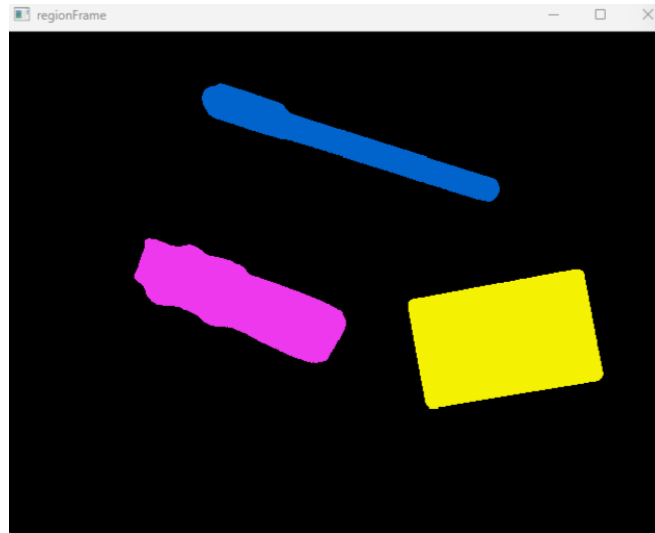


Figure 3: Region Frame

Task 4: Computing features

The function computes a set of features (translation, scale, and rotation invariant) to the region using the region map and ID.

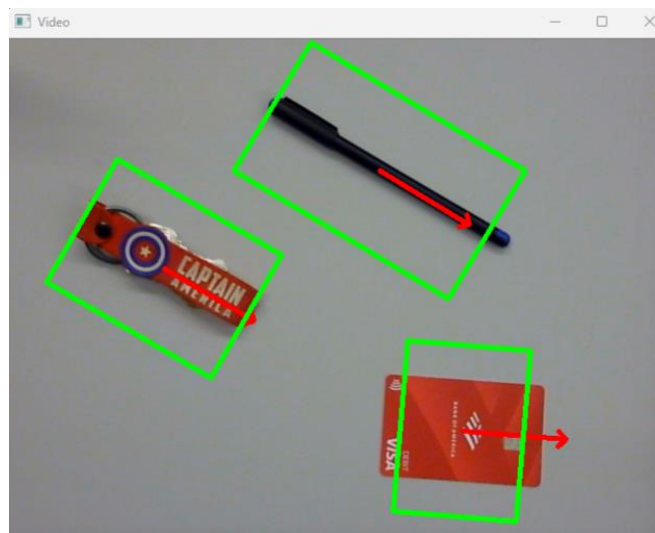


Figure 4: Computed Frame

Task 5: Training data

After the detection of objects, the key "T" should be pressed to enter training mode which allows the collection of the feature vector with labels and storing them in the database by pressing the assigned key to the object.

Task 6: Classifying object

After training, the system automatically recognizes and labels the object as shown below in Figure 5.



Figure 5: Classified Frame

Task 7: Different classifier

Implemented different classifiers where the k is less than 1.

Task 8: System performance

The accuracy is observed to be around 0.7 and the precision of 0.8.

Task 9: Demo video of the project

Google Drive: Click the “ [Link](#) ” to access Drive.

Acknowledgment:

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