Decision level data fusion in Speech and Image Recognition Systems

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Objectives

- To recognize 4 different words through automatic speech recognition.
- BASED ON THE RECOGNIZED WORD, A IMAGE RECOGNITION SYSTEM TO BE DEVELOPED TO RECOGNIZE THE OBJECT PERTAINING TO THE COMMAND GIVEN.

Objective 2- Approaches

- Correlation/Windowing Method (Not used in our project)
- Supervised Learning Method

Method-2

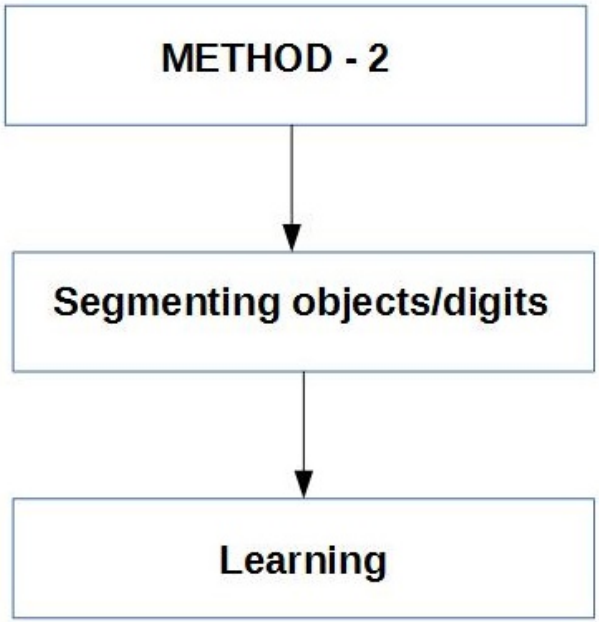


Figure: Flow of Method-2

Segmenting objects

- Separate out each object/digit.
- Attach/tag the coordinates of each segmented digit.(test images)

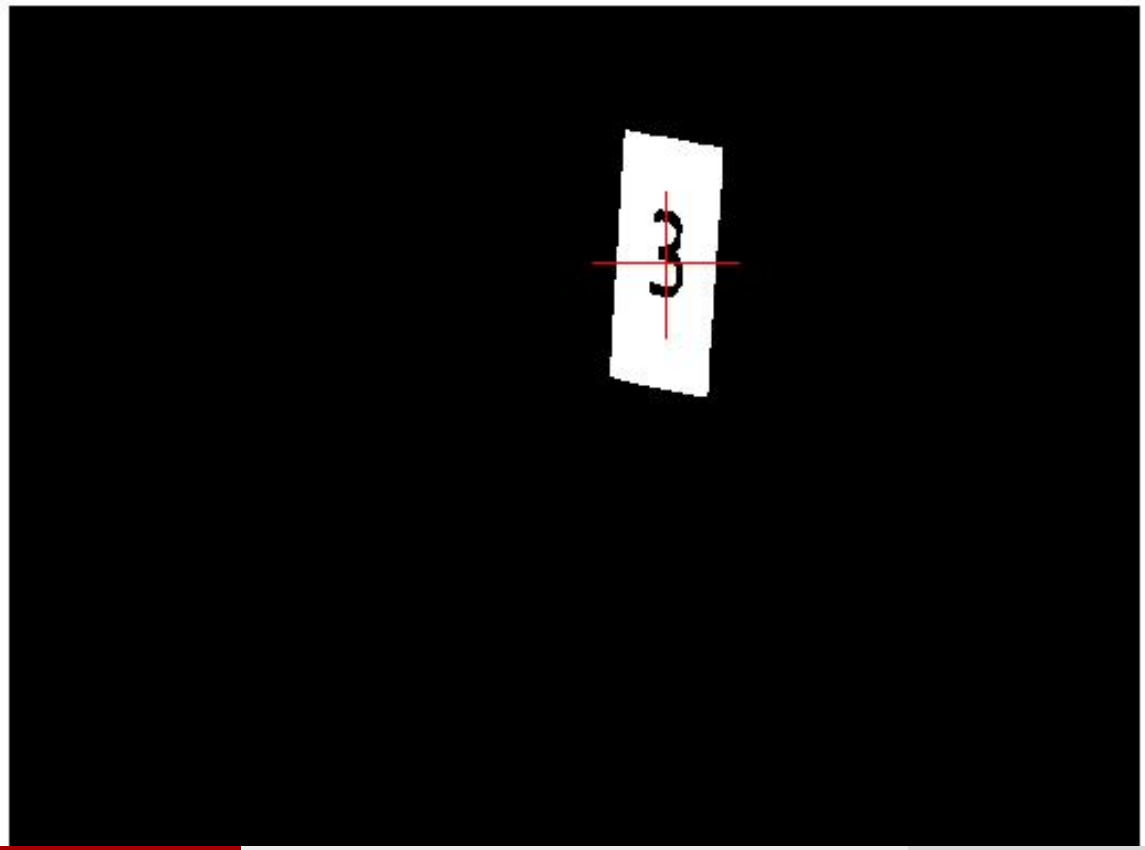
Otsu's Method - Segmentation

- Calculates the threshold value based on the variances of two classes separated by temporary pixel value.
- Optimum value is selected based on maximum inter variance and minimum intra variance of two classes.
- Based on the threshold value we convert the grayscale image to binary image.

Binary Image after Otsu's Segmentation

Flood fill Algorithm

- Determines the area connected to a given node in a multi-dimensional array. Here the red point represents the centroid of the object.



Learning

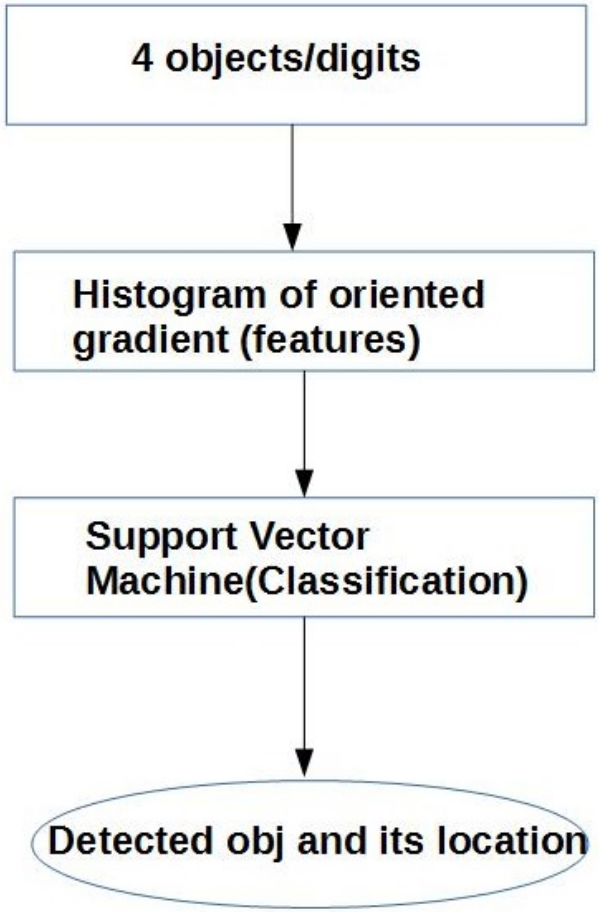
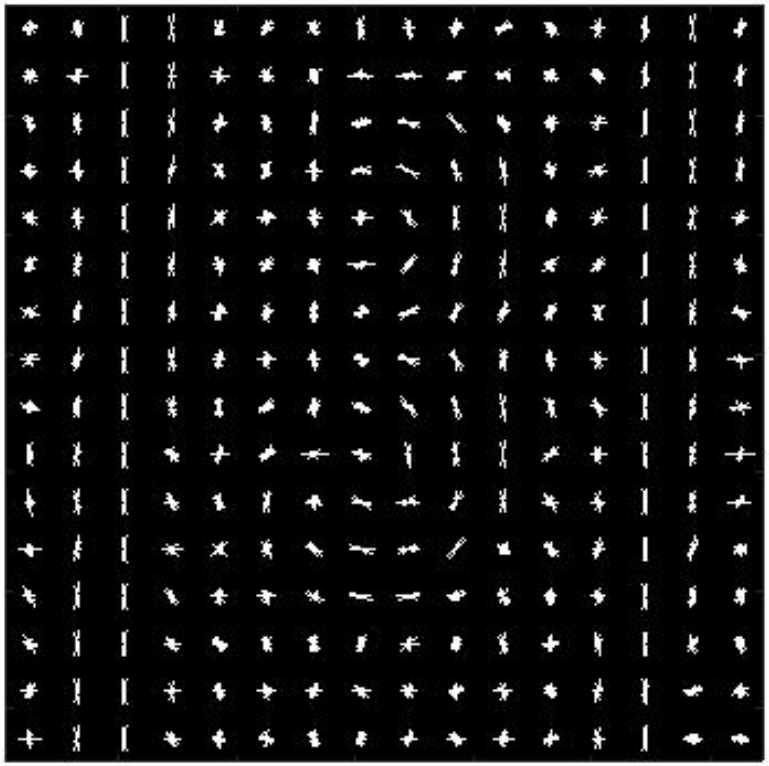


Figure: Flow of Learning

HOG Features of segmented object

- It is based on the theory that shape within an image can be described by the distribution of intensity gradients or edge directions.



References

N. Dalal and B. Triggs, *" Histograms of Oriented Gradients for Human Detection",Proc. IEEE Conf. Computer Vision and Pattern Recognition, vol. 1, pp. 886-893*,2005

LeCun, Y., Bottou, L., Bengio, Y., and Haffner. P *"Gradient-based learning applied to document recognition." Proceedings of the IEEE, 86, 2278-2324,* 1998

Y. Netzer, T. Wang, A. Coates, A. Bissacco, B. Wu, A.Y. Ng, *"Reading Digits in Natural Images with Unsupervised Feature Learning"*, NIPS Workshop on Deep Learning and Unsupervised Feature Learning 2011.

Subransu Maji,Jithendra Malik , *"Fast and Accurate Digit Classification"*, University of California at Berkeley.

Thank You !!!