
Automatic Image Annotation

By:
Eshan Gaur

What is Image Annotation?

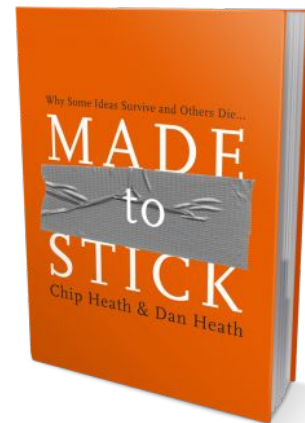
Image Annotation is the process by which a computer system annotates keywords or captions to a digital image.

Why Automatic?

There are basically two types of Image Annotations:

- Manual
- Automatic

Here , I am implementing automatic image annotation using Support Vector Machines(SVMs).



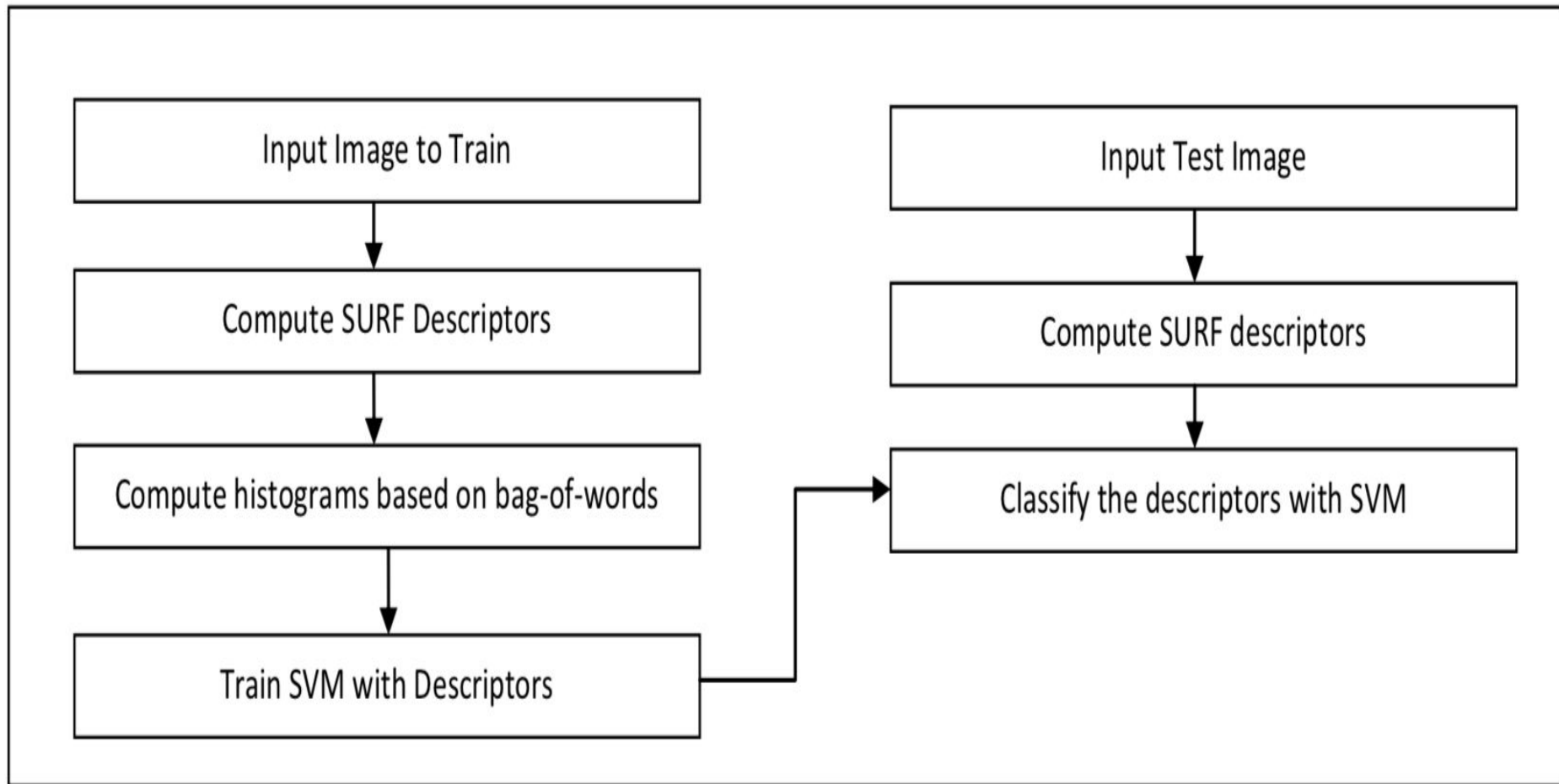


Figure 1: Proposed Framework

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**How have I gone about the
process before training the
SVM?**

**First there is Feature
Detection and then Region
Segmentation.**

Features Detection!

For this, I have used SURF.

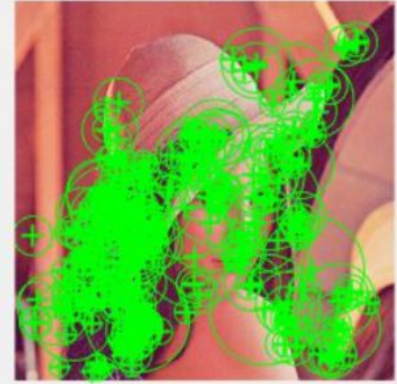
(Speeded up Robust Features)

I have have successfully
concluded that **SURF** is
the best feature extractor
combining speed and
accuracy.

Original Image 1



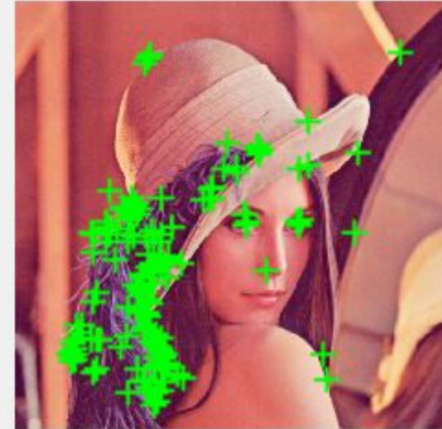
SURF Features



MSER Features



FAST Features



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Out of all the Feature Detectors, SURF was the most balanced choice.

Although the most features were by MSER, but the fast along with most features were of SURF.

REGION SEGMENTATION

For the segmentation of various parts of Images, I have used K- Means Clustering.

Taking k (the number of clusters) as 3, the standard, I have successfully implemented region segmentation.

Tissue image

H&E Image

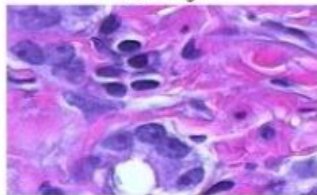
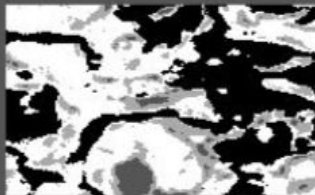
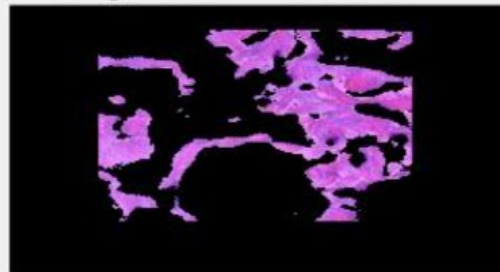


Image courtesy of Alan Packer, University of Cambridge

image labeled by cluster index



Objects in cluster 1



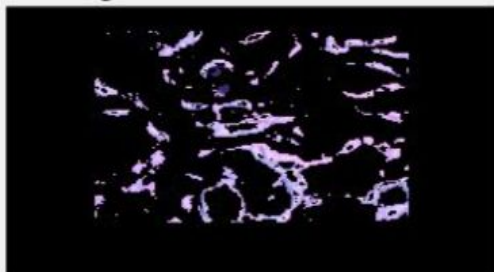
objects in cluster 2

H&E Image

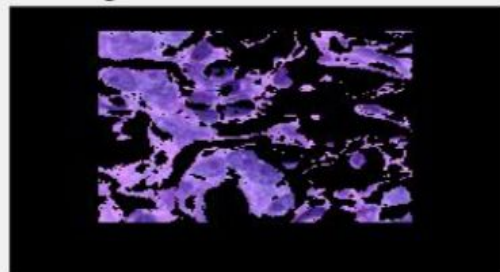


Image courtesy of Alan Packer, University of Cambridge

objects in cluster 3



objects in cluster 4





SVMs

In machine learning, **support vector machines (SVMs, also support vector networks)** are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. They mainly consist of:

- **Support Vectors**
- **HyperPlane**

Quantitative Analysis

For quantitative analysis, I have used Recall, Precision and Fmeasure.

Along with the accuracy.

Thank You