

# Viola Jones Algorithm with GPU Optimization

( Anees Ahmed 58875 MS-CS, Arif Sultan 5906 MS-EE)

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## Viola Jones Algorithm (VJA) for Image Recognition:

VJA is a well defined and popular algorithm use for image-recognition, especially facial images. The algorithm requires a handful of positive (with face ) as well as negative (without face) images for training and validation. Its training could takes more time but its deduction is faster than others (2). After getting training it could predict a new image that it has a face or not and classify the face object with matching class.

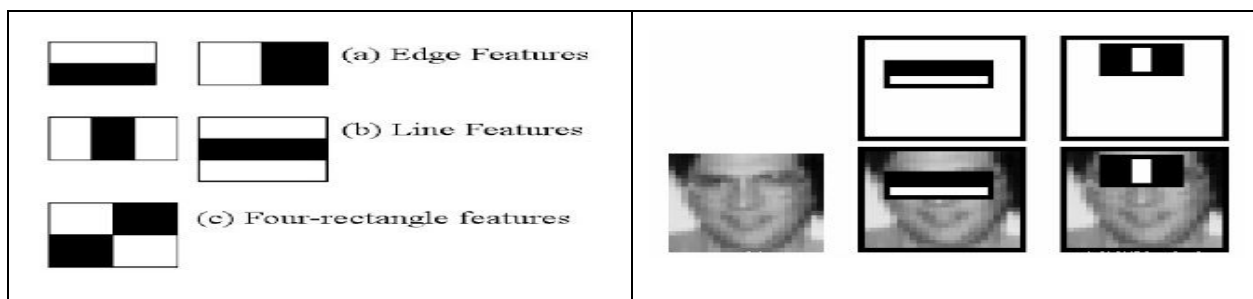
The use of VJA uses HAAR (1) approach to identifying edges and boundaries and use these boundaries to distinguish images from having a face or without any face.

## The HAAR Cascade Algorithm

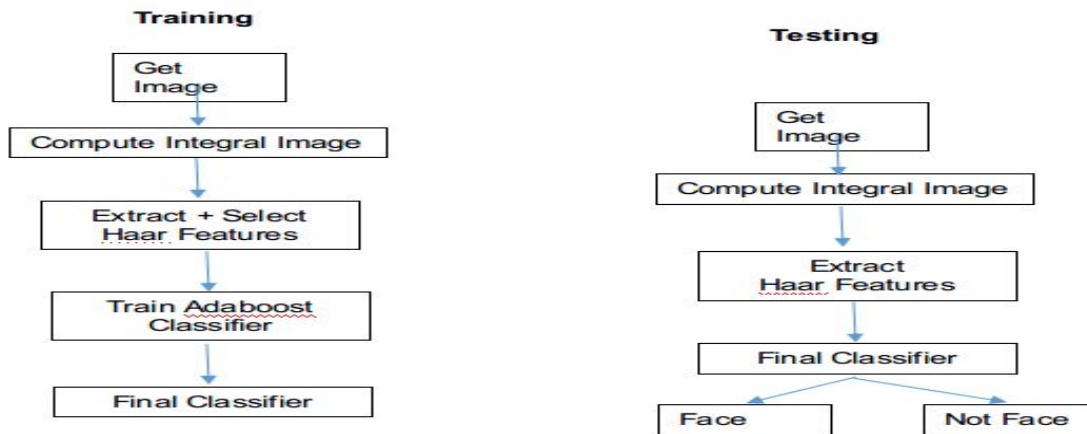
The HAAR Cascade Algorithm is a classifier that classifies a deducted images( positive) to a class available within a set of classes. The algorithm is a machine learning object detection algorithm used to identify objects in an image or video and based on the concept of features proposed by Paul Viola and Michael Jones in their paper "Rapid Object Detection using a Boosted Cascade of Simple Features" in 2001(3).

The algorithm has four stages:

- Haar Feature Selection
- Creating Integral Images
- Adaboost Training
- Cascading Classifiers
- It is well known for being able to detect faces and body parts in an image but can be trained to identify almost any object.



## Our Implementation



## Codes

[VJA implementation in python](#) (Requires Anaconda Distribution of Python 3.6, and libraries mentioned in the top of the codes with import statements)

[Cuda Implementation](#) (Requires Cuda toolkit and tested over Linux environment)

[Photo Database Setup](#)

## Our Contribution:

	Anees Ahmed (working %age)	Arif Sultan (working %age)
Research and Review	50	50
Analysis and Implementation work	50	50
Python implementation	50	50
Cuda Coding	30	70
Reporting	60	40





## References:

1. [http://wearables.cc.gatech.edu/paper\\_of\\_week/viola01rapid.pdf](http://wearables.cc.gatech.edu/paper_of_week/viola01rapid.pdf)
2. <http://www.cse.psu.edu/~rtc12/CSE586/lectures/violaJonesDetector.pdf>
3. <http://www.willberger.org/cascade-haar-explained/>
- 4.