



# Rapid Object Detection using a Boosted Cascade of Simple Features

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# Introduction

- Construct a robust framework
- Fast and rapid object detection
- Operates on 384\*288 pixels images
- Faces are detected at 15 frames per second
- Can be implemented on small low power devices as well

# Main contributions in Object Detection Framework

- Integral Image
- Learning Algorithm
- Method to combine complex classifiers

# Integral Image

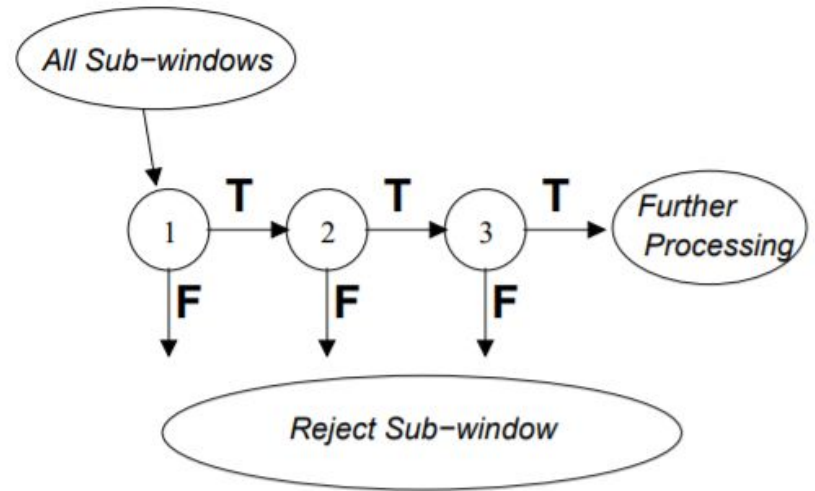
- Feature based
- Computes intermediate interpretation integral image
- Sum of pixels above and to the left of  $x,y$  inclusive
- Rich image representation for effective learning

# Learning Function

- Based on AdaBoost Algorithm
- Weak learner classifier constrained to single feature
- Choose classifier with least error
- Selects small number of potential important features

# Attentional Cascade of classifiers

- Reduces half no. of locations to be evaluated
- Degenerate decision tree structure
- Eliminates negative examples with little processing



# Results

- Image processed in 0.67 seconds
- Evaluated 10 features out of 6061 per sub-window
- Detector is scaled rather than the image
- 15 times faster than any previous image detection