

Module 5 - Object Detection

Object Detection

- Sliding Windows
 - Slides a fixed-size window across the image
 - Each window is classified:
 - If object (e.g., dog) is present → label as "dog"
 - If no object → label as "background"
 - Moves across the image row by row, left to right, top to bottom
- Bounding Box
 - A rectangle around the detected object
 - Goal of detection: Predict bounding box coordinates for each object
- Bounding Box Pipeline
 - Start with a dataset of images, object labels, and bounding boxes
 - Train a model to learn both the object class and box coordinates
 - At prediction time, the model outputs:
 - Predicted class (e.g., dog, cat)
 - Predicted bounding box (location of object)
- Score
 - Each detection comes with a confidence score (0 to 1) → higher confidence scores indicate higher confidence
 - You can set a threshold (e.g., 0.9) to filter out low-confidence predictions

Object Detection with Haar Cascade Classifier

A machine learning method where a cascade function is trained on a large number of positive images

- Trained on both positive and negative images
- Based on the Haar wavelet sequence: Haar wavelets are convolution kernels used to extract features. Haar wavelets extract information about: Edges, Lines, Diagonal edges

Practice Assessment

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Assignment details

Submitted
May 5, 9:50 PM EDT

Attempts
Unlimited

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Your grade

To pass you need at least 50%. We keep your highest score.

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50%

1. P. Viola and M. Jones based the idea of the Cascade classifier on which of the following?

1 point

- ☐ Sliding window sequence
- ☐ Deep Learning
- ☒ Haar Wavelet Sequence
- ☐ Image feature extraction

2. Which of these are a problem of sliding windows? Select all that apply

1 point

- ☐ Aspect Ratio
- ☒ Object sizes
- ☒ Overlapping objects
- ☐ Grayscale image