

# Binary Classification Using (tensor) LDA

Awais Bajwa,  
Shinho Kang,  
Omar Gutiérrez

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# Outline

Linear Discriminant Analysis

Tensor Linear Discriminant Analysis

# Linear Discriminant Analysis

- ▶ Implement a binary classifier for car detection.
- ▶ Using (conventional) Linear Discriminant Analysis.

Determine  $w$

$$\mathbf{w} = \arg \max_w \frac{\mathbf{w}^T \mathbf{S}_B \mathbf{w}}{\mathbf{w}^T \mathbf{S}_w \mathbf{w}} \quad (1)$$

## Plot from $w$

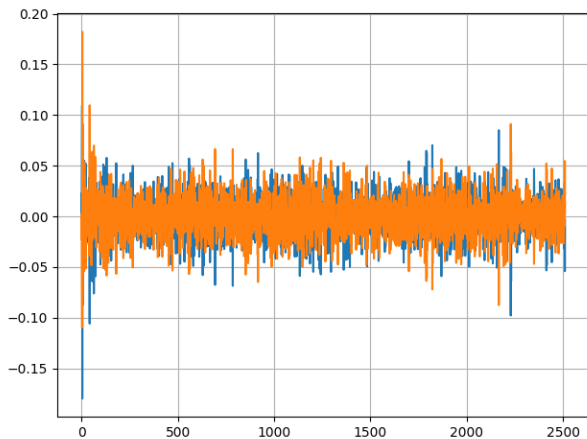


Figure 1: Plot from  $w$

# Result

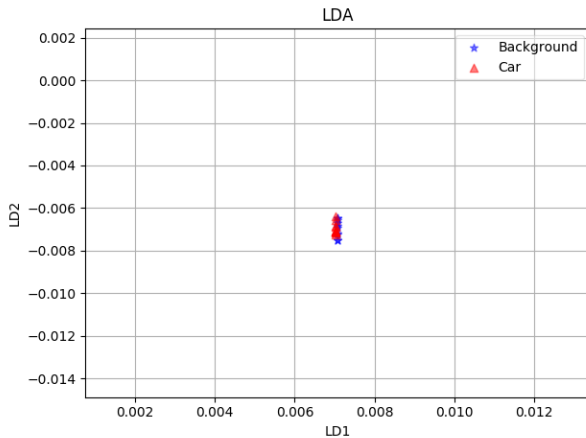


Figure 2: Result from LDA

## Precision and recall

$$Precision = \frac{tp}{tp + fp} \quad (2)$$

$$Recall = \frac{tp}{tp + fn} \quad (3)$$

# Precision and recall

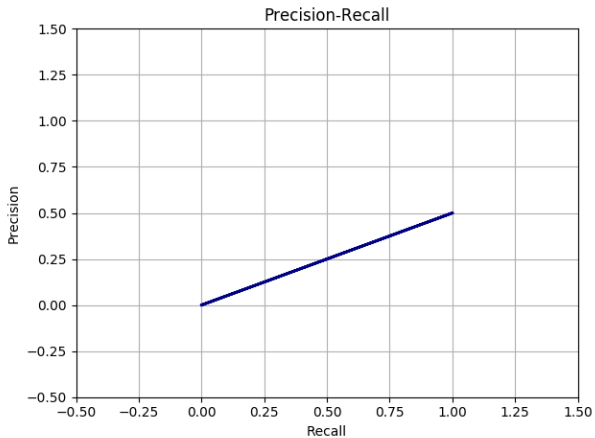


Figure 3: Precision and recall



# Tensor Linear Discriminant Analysis

- ▶ Implement the Tensor Linear Discriminant Analysis

