



## **NPTEL ONLINE CERTIFICATION COURSES**

**Course Name: Deep Learning**

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**Department : E & ECE, IIT Kharagpur**

**Topic**

**Lecture 13: Linear Machine**

## CONCEPTS COVERED

### Concepts Covered:

- ☐ Linear Classifier
- ☐ Support Vector Machine
- ☐ Linear Machine
- ☐ Multiclass Support Vector Machine



# Multiclass Problem: Linear Machine



# Linear Classifier & SVM



# Multiclass Problem: Linear Machine



# Multiclass Problem: Linear Machine



$$\begin{bmatrix} 0.2 & 0.6 & -1.0 & 0.8 \\ 1.5 & 0.9 & 3.1 & 0.1 \\ 0.5 & 1.1 & 0.7 & 0.0 \\ 2.1 & 0.3 & 0.2 & 0.5 \end{bmatrix} \begin{bmatrix} 45 \\ 110 \\ 21 \\ 16 \end{bmatrix} + \begin{bmatrix} 1.1 \\ 5.3 \\ -2.1 \\ 0.6 \end{bmatrix} \Rightarrow \begin{bmatrix} 67.9 \\ 238.5 \\ 156.1 \\ 140.3 \end{bmatrix} \begin{matrix} \textit{Cat score} \\ \textit{Bird score} \\ \textit{Dog score} \\ \textit{Car score} \end{matrix}$$

$$f(X_i, W, b)$$



# Interpretation



$$\begin{bmatrix} 0.2 & 0.6 & -1.0 & 0.8 \\ 1.5 & 0.9 & 3.1 & 0.1 \\ 0.5 & 1.1 & 0.7 & 0.0 \\ 2.1 & 0.3 & 0.2 & 0.5 \end{bmatrix} \begin{bmatrix} 45 \\ 110 \\ 21 \\ 16 \end{bmatrix} + \begin{bmatrix} 1.1 \\ 5.3 \\ -2.1 \\ 0.6 \end{bmatrix} \Rightarrow \begin{bmatrix} 67.9 \\ 238.5 \\ 156.1 \\ 140.3 \end{bmatrix} \begin{matrix} \textit{Cat score} \\ \textit{Bird score} \\ \textit{Dog score} \\ \textit{Car score} \end{matrix}$$

$$f(X_i, W, b)$$

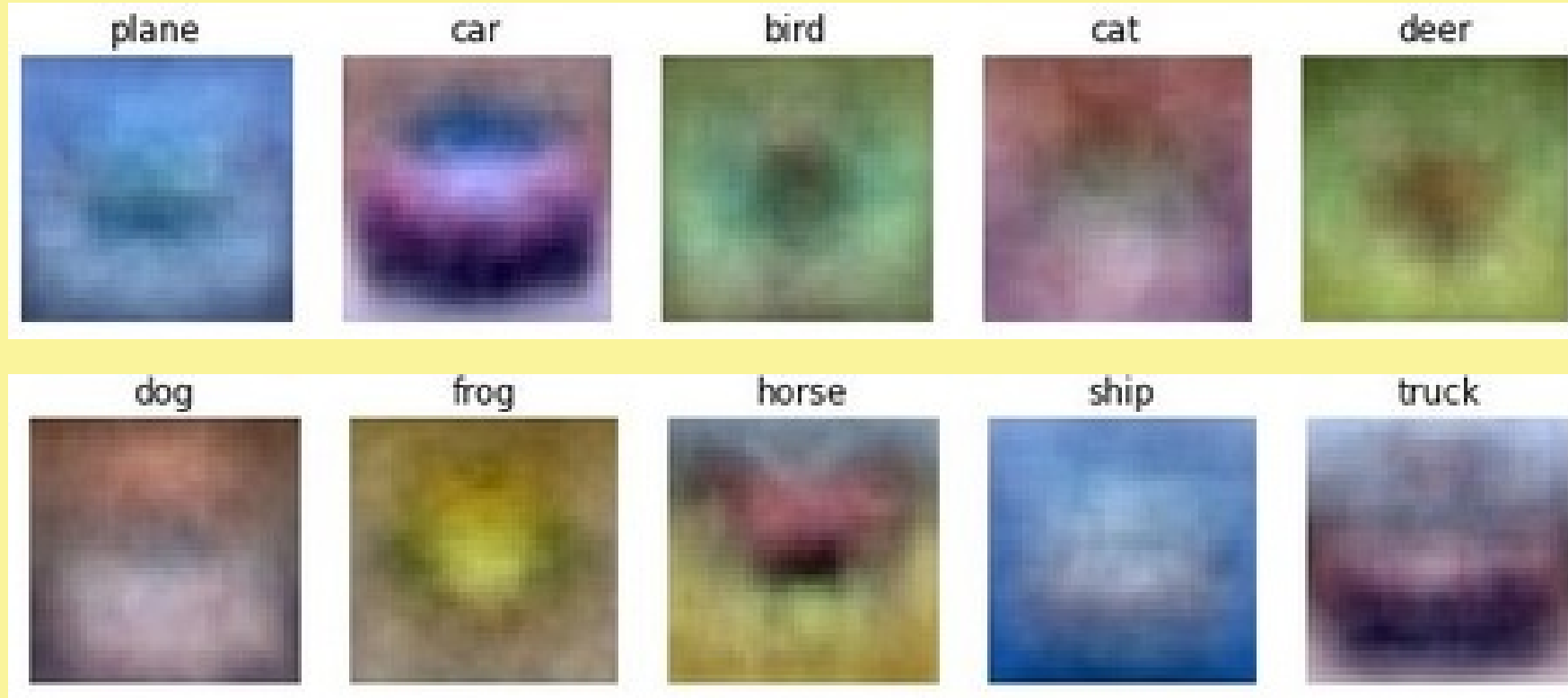


# Interpretation





# Multiclass Problem: Linear Machine



Source - <http://cs231n.github.io>



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*Thank  
you*

