Supervised ML Workshop

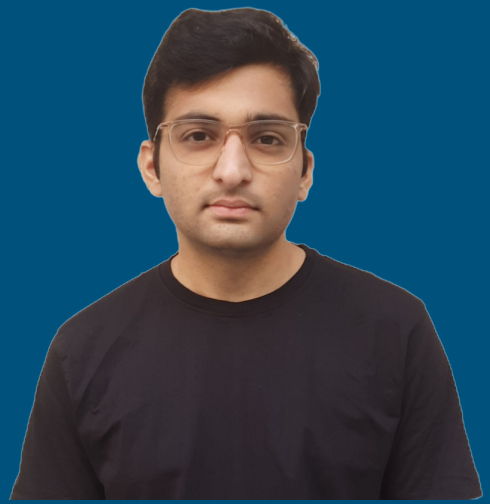
DIT Pimpri

A workshop by Atharv, Ayush, Yash

Agenda for Workshop

Supervised Machine Learning

1. Overview of ML
2. Linear Regression
3. Logistic Regression
4. Decision Trees
5. Ensemble Methods – Part 1:
    - Cascading
    - Stacking
6. Ensemble Methods – Part 2:
    - Bagging
    - Boosting



Atharv

AI/ML Developer

GDG DIT - Machine Learning Lead

Works with the AI team at ElevateTrust.AI

Always learning, building, and sharing

Passionate about AI, ML, Generative AI, EdgeAI

Ayush

AI/ML Developer

GDG DIT - Machine Learning Co-Lead

Turning data into insights with ML & AI, one model at a time.

Building apps where Machine Learning meets real-world impact.

Speedcuber — learned algorithms from cubes, patience (and suffering) from code.

Yash

AI/ML Developer

GDG-DIT Research Lead

Ex CP Member Lead

Ex Intern Accenture

Passionate about innovative tech

Forever Student

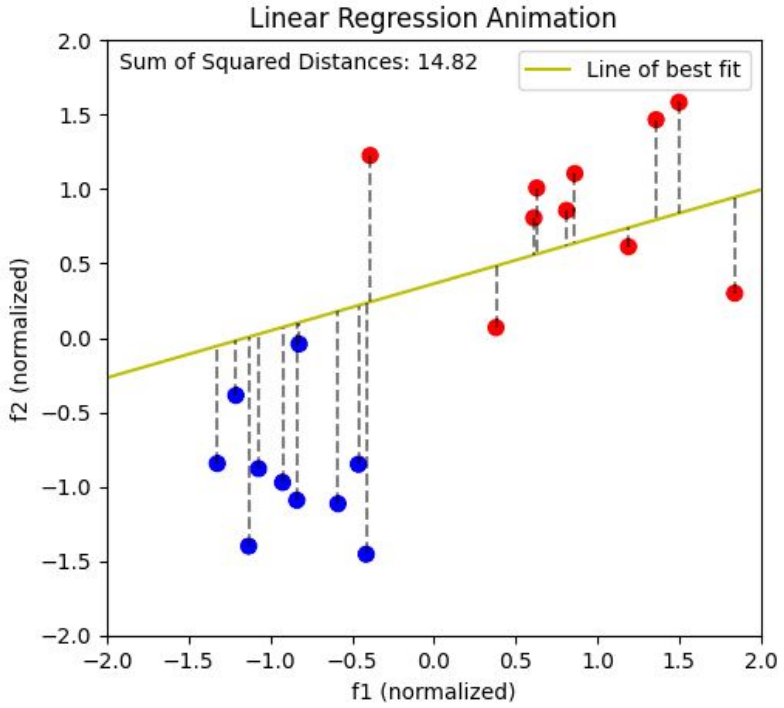
What is
LOGISTIC REGRESSION?

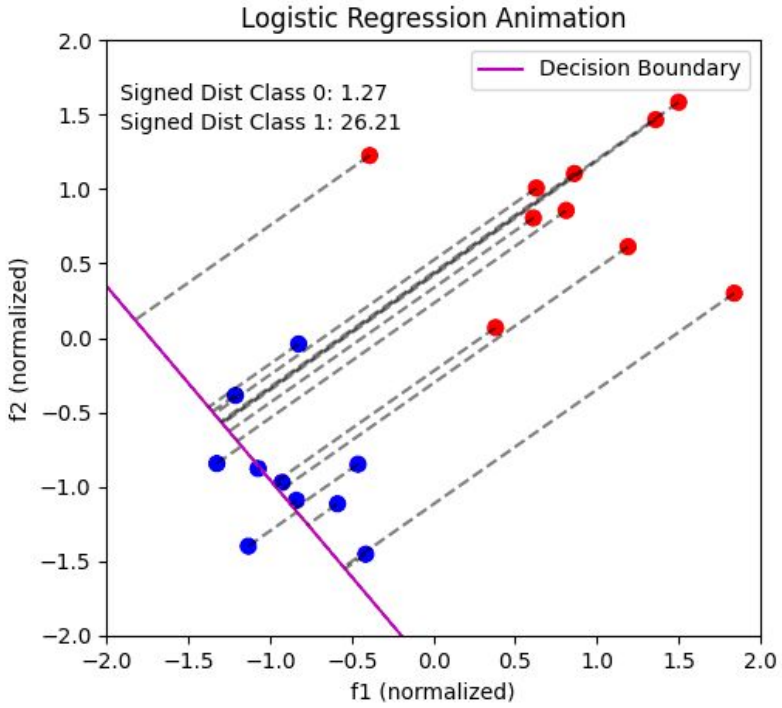

LOGISTIC REGRESSION
IS USED FOR CLASSIFICATION
makeameme.org

Logistic regression is a machine learning algorithm that predicts the probability of an event (Yes/No) and classifies it as 0 or 1 using the sigmoid function.

Example : Predicting whether a student will pass or fail based on study hours and assignments completed.

Linear Regression VS Logistic Regression





Predicting whether it will rain tomorrow or not

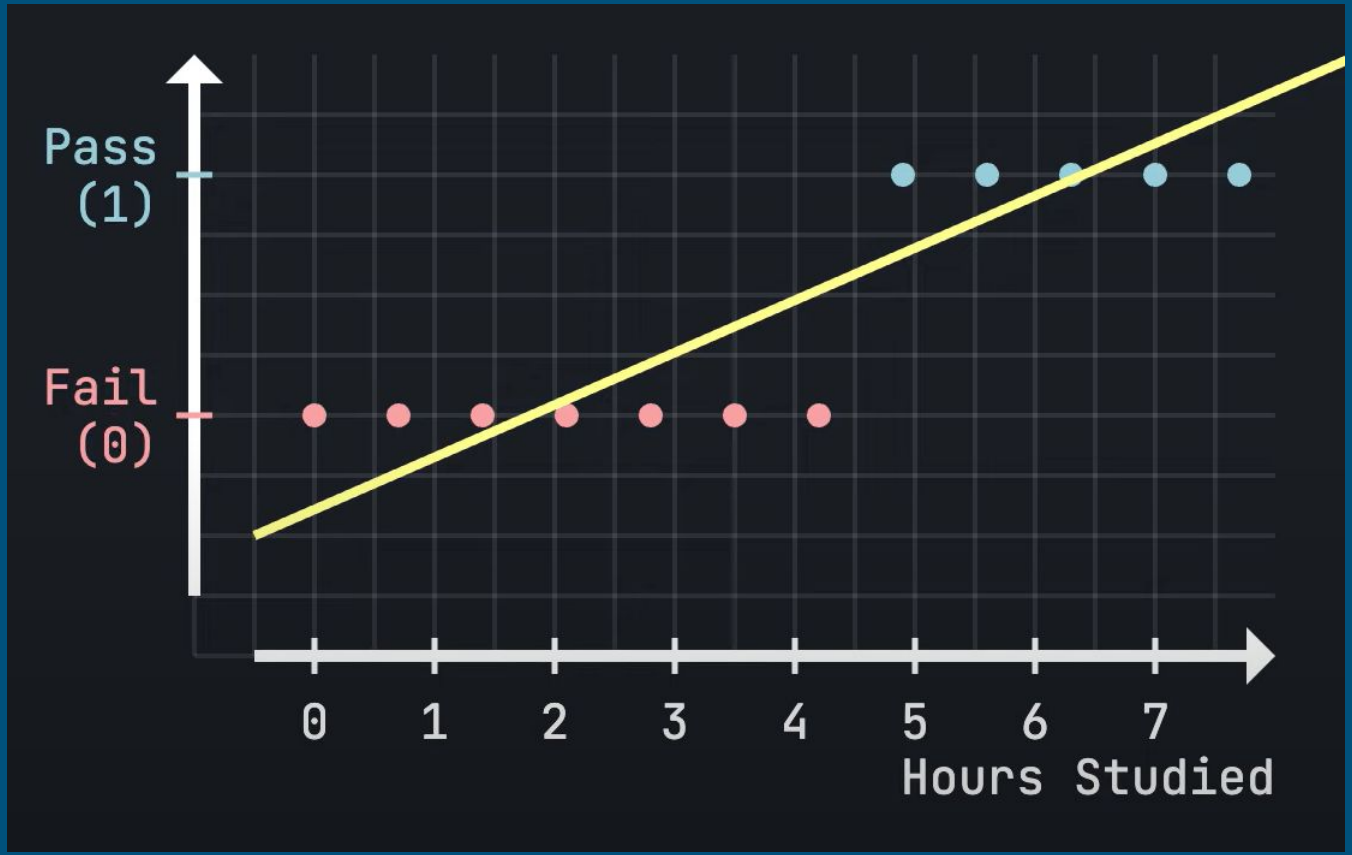
Understanding Logistic Regression with a Practical Example

This dataset explores whether two numerical features—last night's sleep duration and self-rated class interest—can predict a binary outcome: a student's decision to attend class.

Look at the data. Do you see a pattern?

Sleep Last Night	Class Interest (1–10)	Attend Class (y)
8	7	Y
10	6	Y
4	7	N
9	3	N
7	10	Y

Fitting a Line for Classification

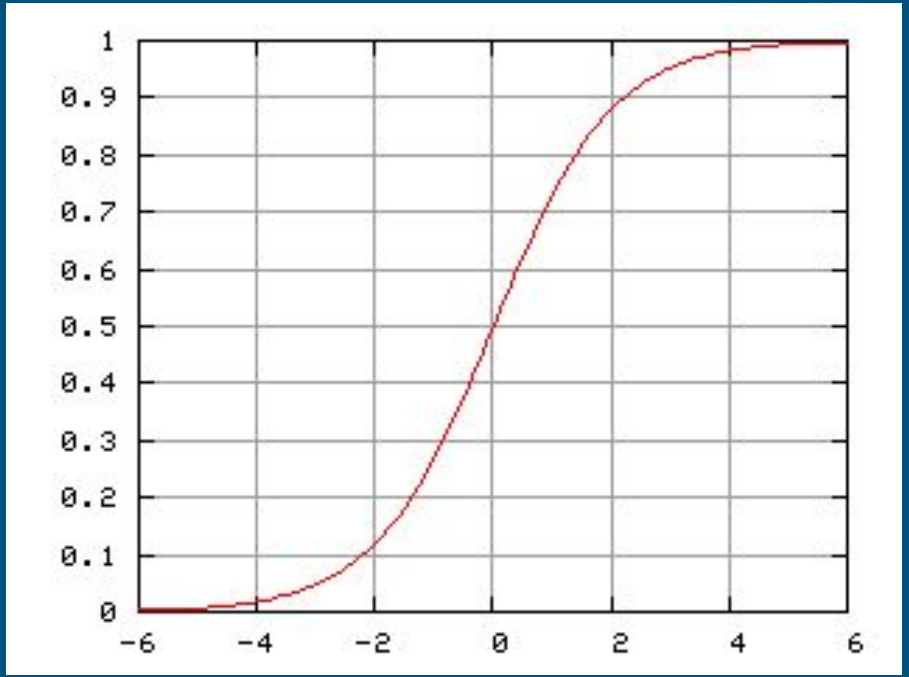


SIGMOID FUNCTION

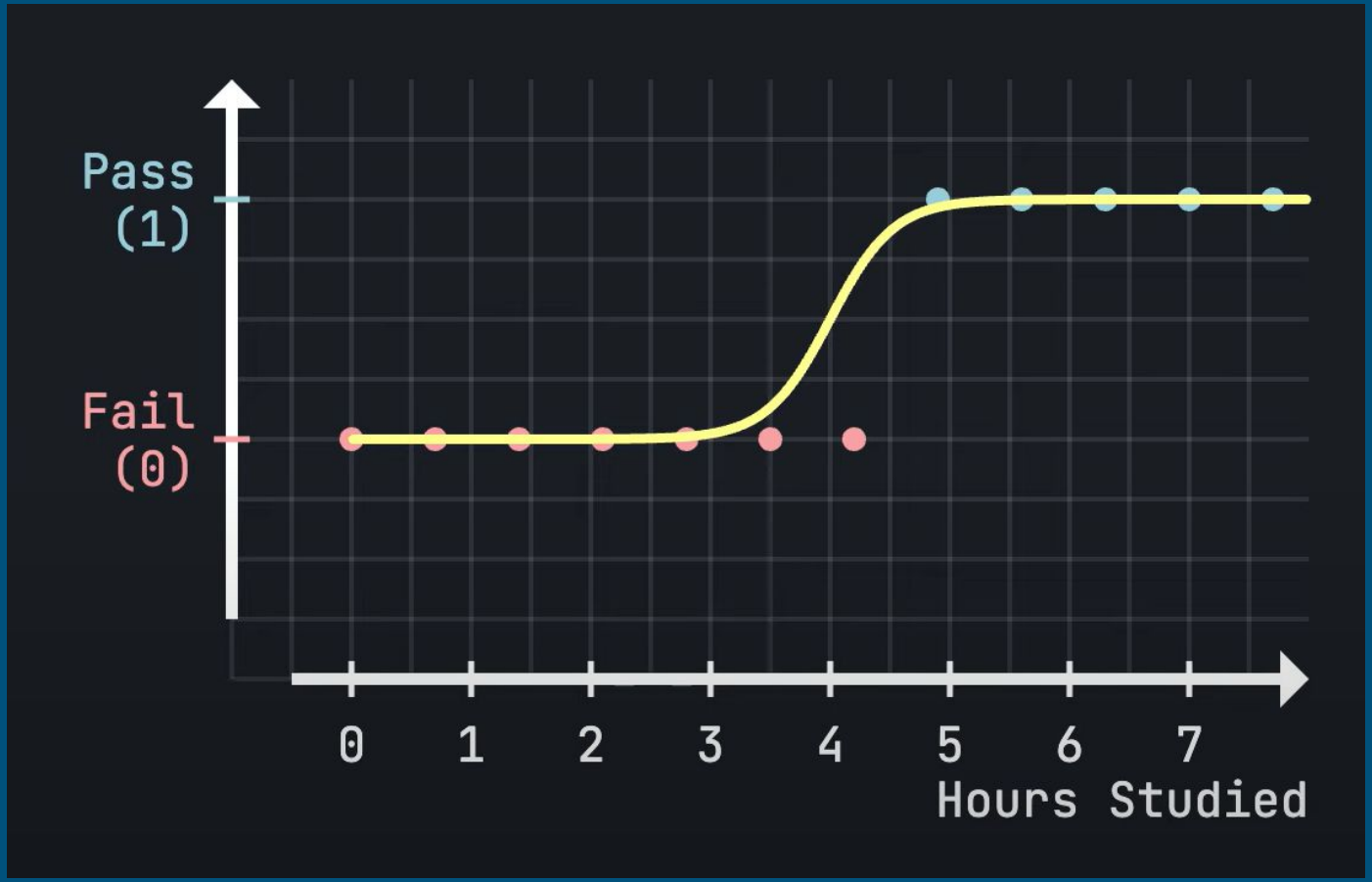
$$\sigma(x) = \frac{1}{1 + e^{-x}}$$

The sigmoid function is an S-shaped curve that maps any input number to a value between 0 and 1, making it perfect for probabilities.

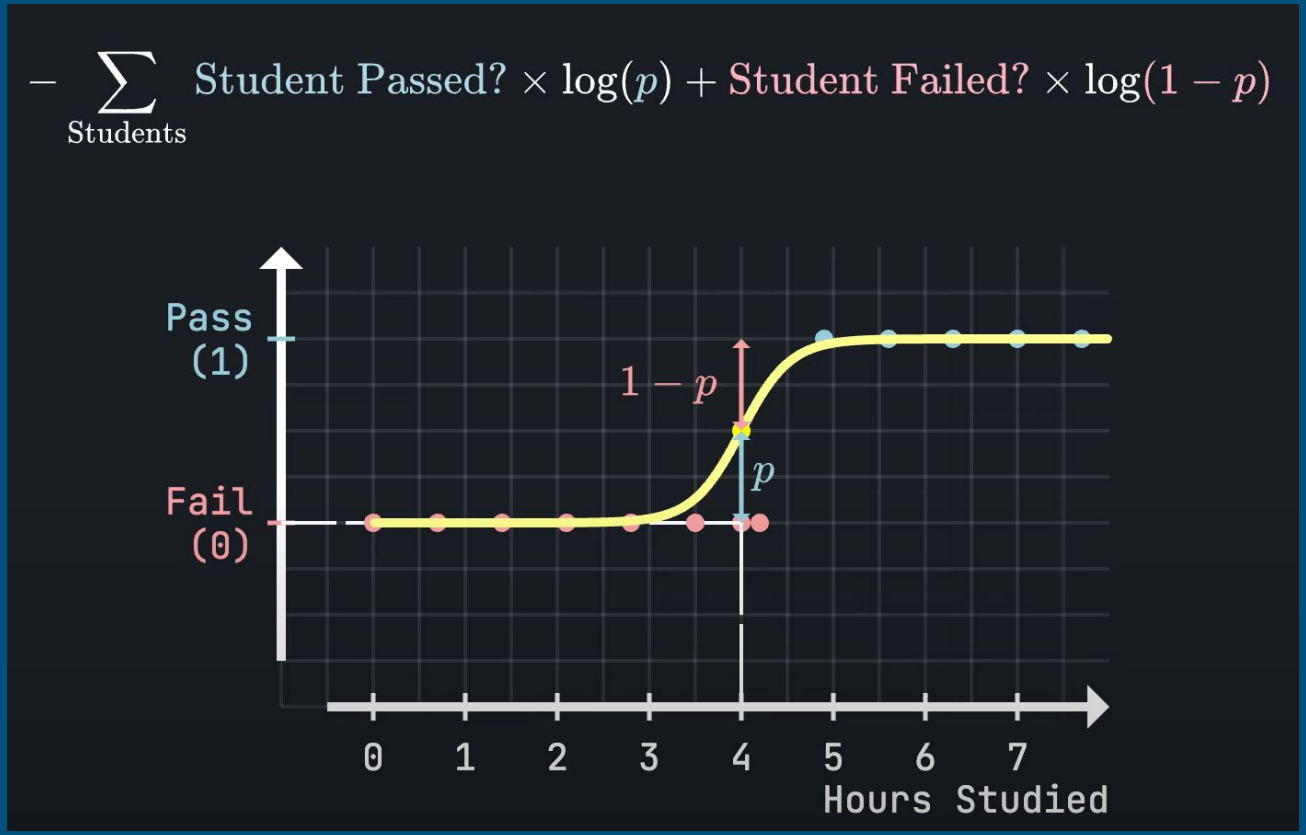
It helps logistic regression decide how likely an event is, such as predicting rain or whether someone will wear a jacket.



Fitting a Sigmoid curve for classification



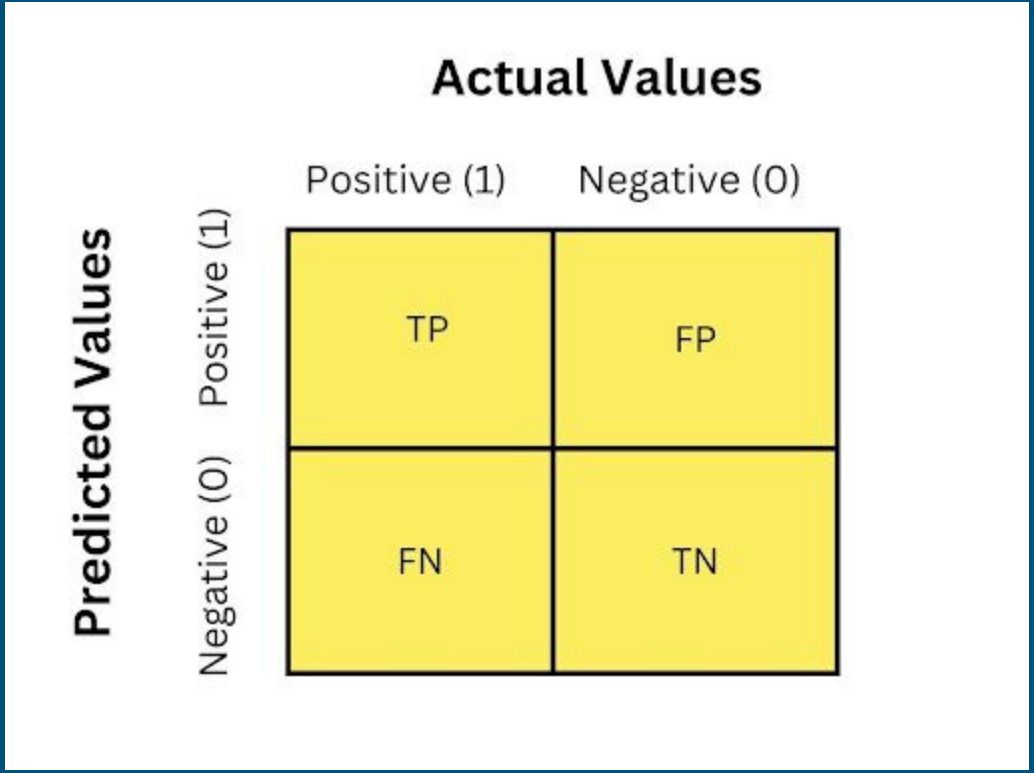
Calculating Loss Function for sigmoid curve

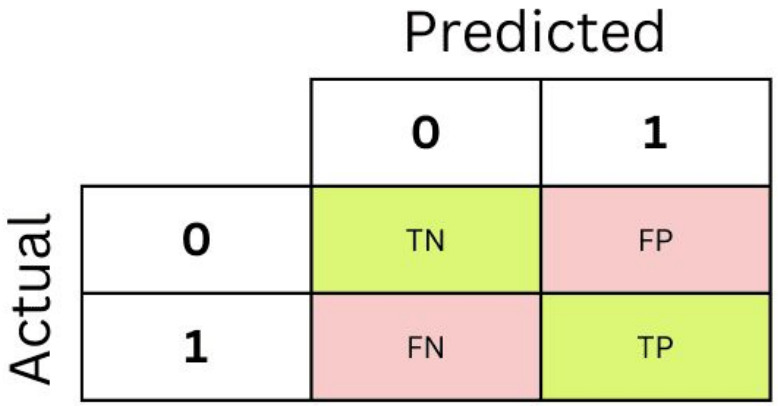


🧠 Logistic Regression in 5 Steps

1. Collect Features – Take input values (x_1, x_2, …)
2. Linear Combination – Compute $z = w_1x_1 + w_2x_2 + b$
3. Sigmoid – Convert z to probability $p = 1 / (1 + e^{-z})$
4. Decision – If $p \geq 0.5 \rightarrow$ Class 1, else Class 0
5. Train – Adjust weights using gradient descent until accurate

Confusion Matrix





$$Precision = \frac{TP}{TP + FP}$$

$$Recall = \frac{TP}{TP + FN}$$

Implementation

Assignment

1. Explore more on Linear Regression refer this video https://youtu.be/ilkJrwVUI1c
2. Explore Polynomial Regression

Connect with us on LinkedIn

Atharv SP

AI/ML Developer | AI Agents · RAG · LLMs · Generative AI | GDG-DIT AI/ML Lead

Ayush VaZe

DYPIT'26 | AI Enthusiast | Python • Machine Learning • Deep Learnin...

Yash Shinkar

Ex-Intern @ Accenture | AI & DS Student

Join GDG DIT - ML Community

Thank You