Linear Algebra

Linear algebra is a branch of mathematics that focuses on the study of vectors, vector spaces (also called linear spaces), linear transformations, and systems of linear equations. It provides a framework for understanding the properties and operations of these mathematical objects, which can be represented using matrices and vectors.

① Foundational Concepts → ML, DL, NLP, Images

↓

Scalers, Vectors, Matrices, Mathematical Operation of Matrices, Linear Transformation

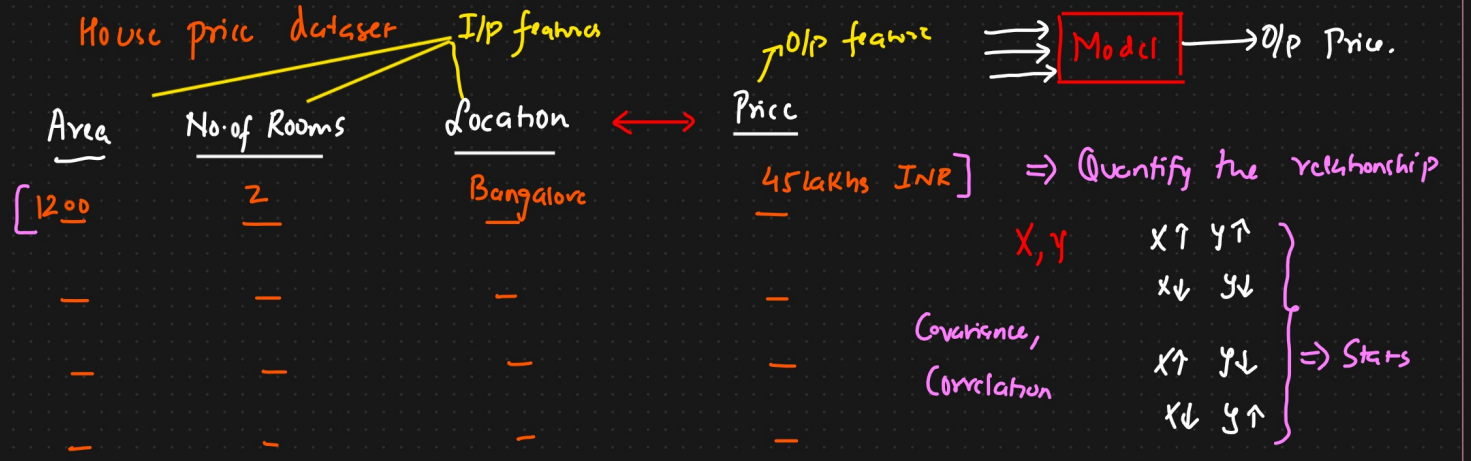
Eigen Value Eigen Vector

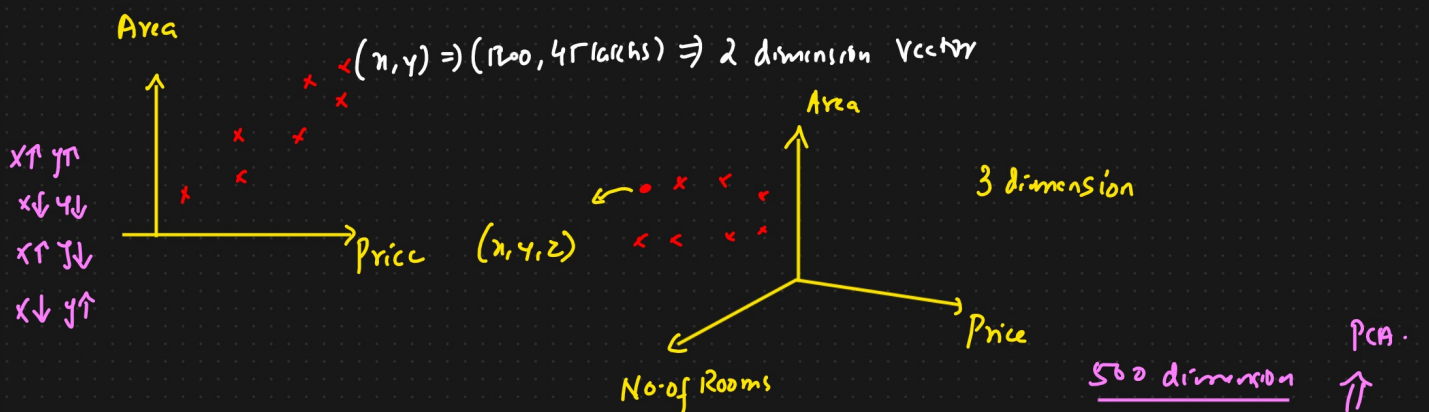
① Physics ② Mathematics ③ Computer Science Student. [Data Science].

Applications of linear Algebra

1) Data Representation And Manipulation

DATASET → Create Model which will be able to predict. $\vec{v} = [1200]$ $\vec{v} = [1200\ 2]$





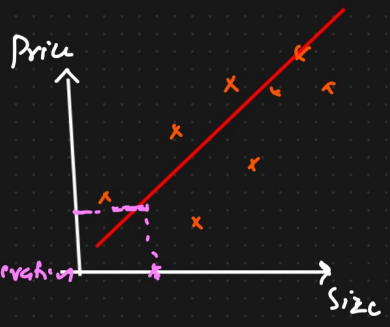
500 dimension → PCA.

↓ Dimensionality Reduction

2 dimension

① linear algebra works higher dimension data.

② Machine Learning And Artificial Intelligence



① Model Train : Linear Algebra → Matrix Multiplication

⇓

Matrix Arithmetic operation

⇓

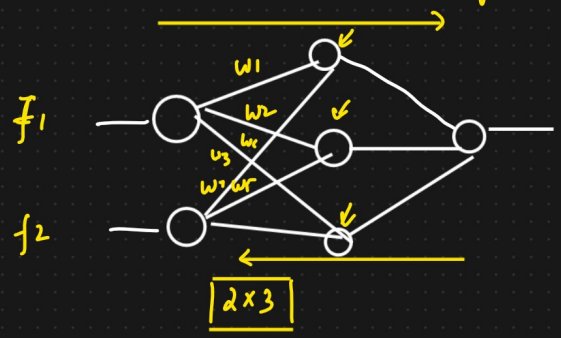
Linear Equation

Equation of a straight line ⇒ $ax+by+c=0 \Rightarrow y=mx+c$

② Dimensionality Reduction ⇒ PCA → Linear Algebra → Eigen Value And Eigen Vector

Reduce from higher dimension → Lower Dimension.

③ Neural NW : Forward propogation and Backward propogation



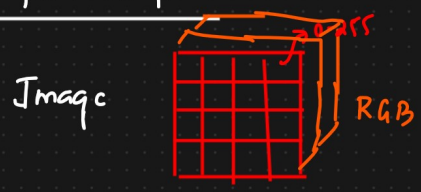
f1 Area, f2 No of Rooms, Op Price

⇒ GPU → Cores → Parallelly

Tensorflow → Tensors

$$\begin{bmatrix} f_1 \\ f_2 \end{bmatrix} \begin{bmatrix} w_1 & w_2 & w_3 \\ w_4 & w_5 & w_6 \end{bmatrix} \Rightarrow \text{Matrix Multiplication}$$

③ Computer Graphics



⇒ Scaling, Rotate, Black & White ⇒ Linear ⇒ Transforming

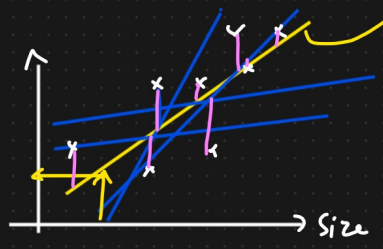
④ Optimization

① Solving Equations : Linear Equation

$y=mx+c$ ⇒ Regression

Slope or coefficient, intercept

↳ $f(x)$ ⇒ Maximize f_n ⇒ Minize the Error



⇒ Right slope and intercept

⇓
GRADIENT DESCENT // ⇒ Optimizer.