



# Algo Professor Hands on Machine Learning Program

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Join **World no.1** Real Time Hands-on  
Interactive & Research Focused  
**AlgoProfessor**  
**Machine Learning Program**



**Algo Professor**

# Machine Learning

## Programme from Algo Professor

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- Neural Networks · Programming Knowledge Required
- Machine Learning Algorithms



# Algo Professor–Dr S.Satyanarayana

- ▶ PhD(Graph Machine Learning Algorithms)
- ▶ 20 Years Experience in  
(Teaching+Research+Industry)
- ▶ More than 50+ Research Papers Published in  
(Scopus/SCI/IEEE/ACM)Index International  
Journals.
- Reviewer of DST (Machine Learning) Projects
- Reviewer of Top ML Journals & Conferences
- Evaluated several PhD theses from various  
Indian Universities as an External Examiner.

# AlgoProfessor

## Machine Learning Program

- ▶ # 4 (Four) Level Courses
- ▶ 1)Basic \_ Level : Internship + Hands-on Python Code
- ▶ 2)Intermediate\_Level : Real Time Project + Blog
- ▶ 3)Advanced \_Level : Real Time Project + Publication in IEEE/SCI/SCOPUS /Top ML Conferences+ kaggle competitions
- ▶ 4)Innovative \_Level : Startup in AI +ML Space

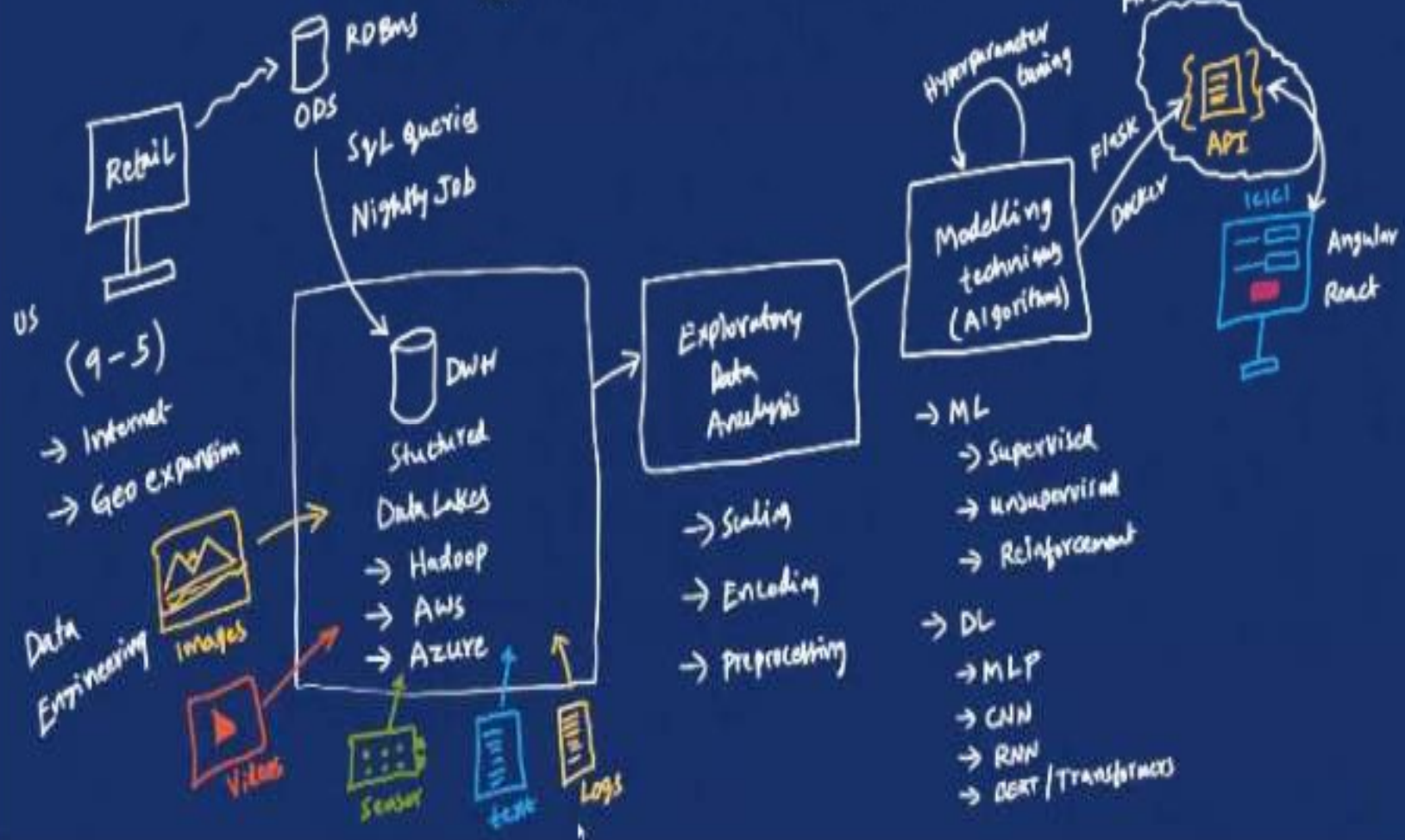
# Target Folks



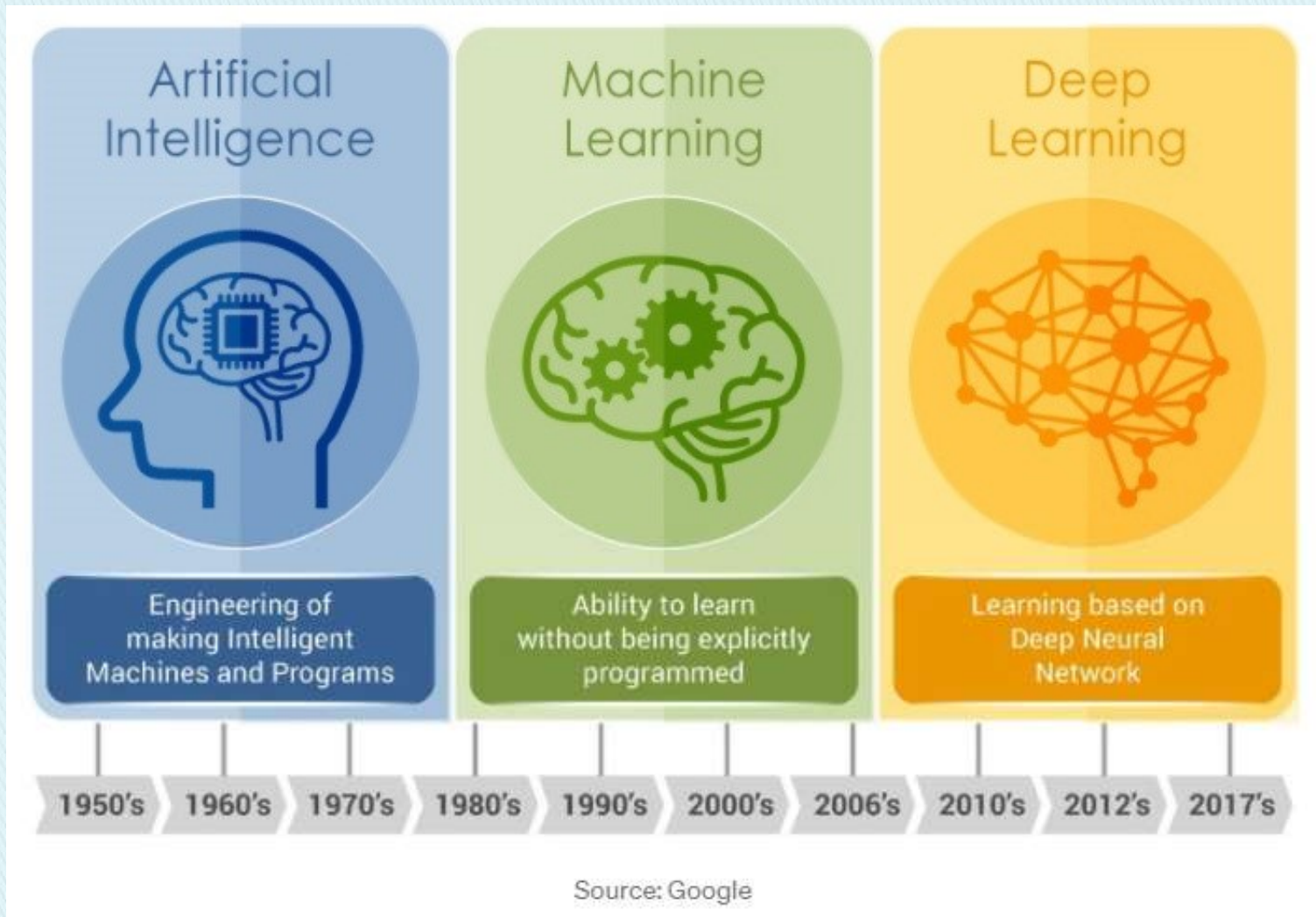
# Target Folks

- ▶ UG( BSc., BS., B.Tech) Students
- ▶ PG (MSc., M.Tech.,M.S) Students
- ▶ PhD Students
- ▶ Post–Doc Students
- ▶ Machine Learning Independent Researchers
- ▶ Machine Learning Industry Experts
- ▶ Career Transition to Machine Learning
- ▶ Data scientists
- ▶ Universities/Engineering College Professors

# End to End Life Cycle of ML/DL







## **Artificial Intelligence**

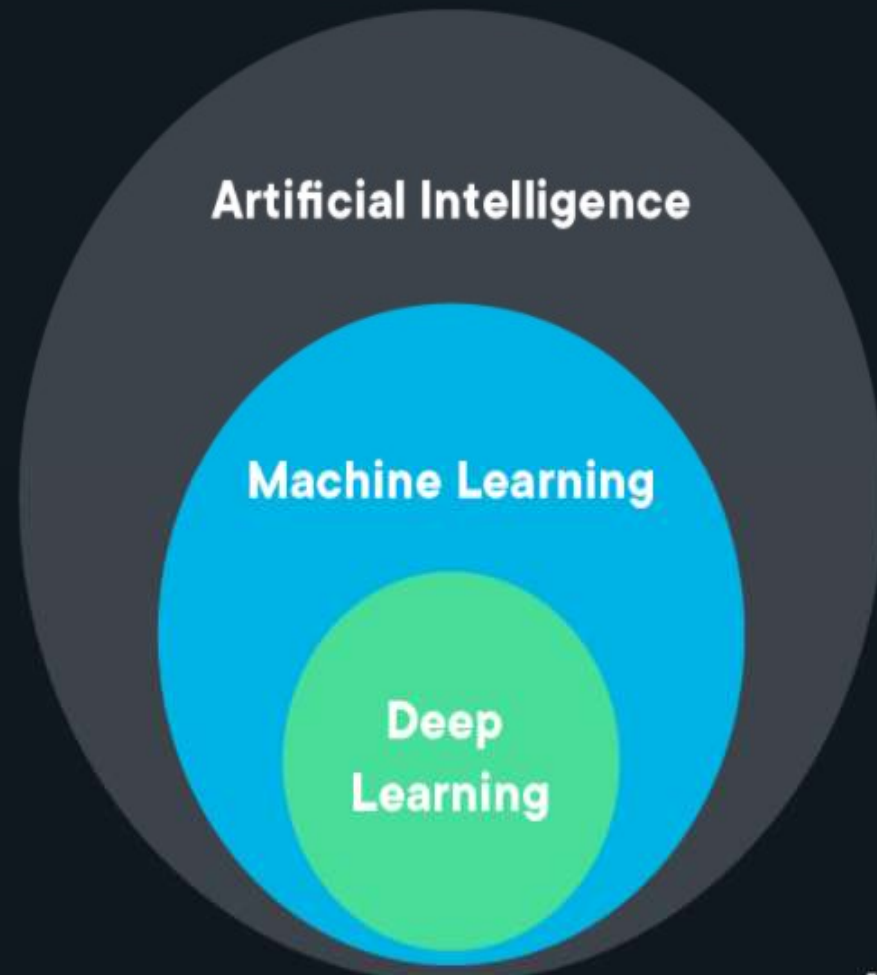
A science devoted to making machines think and act like humans.

## **Machine Learning**

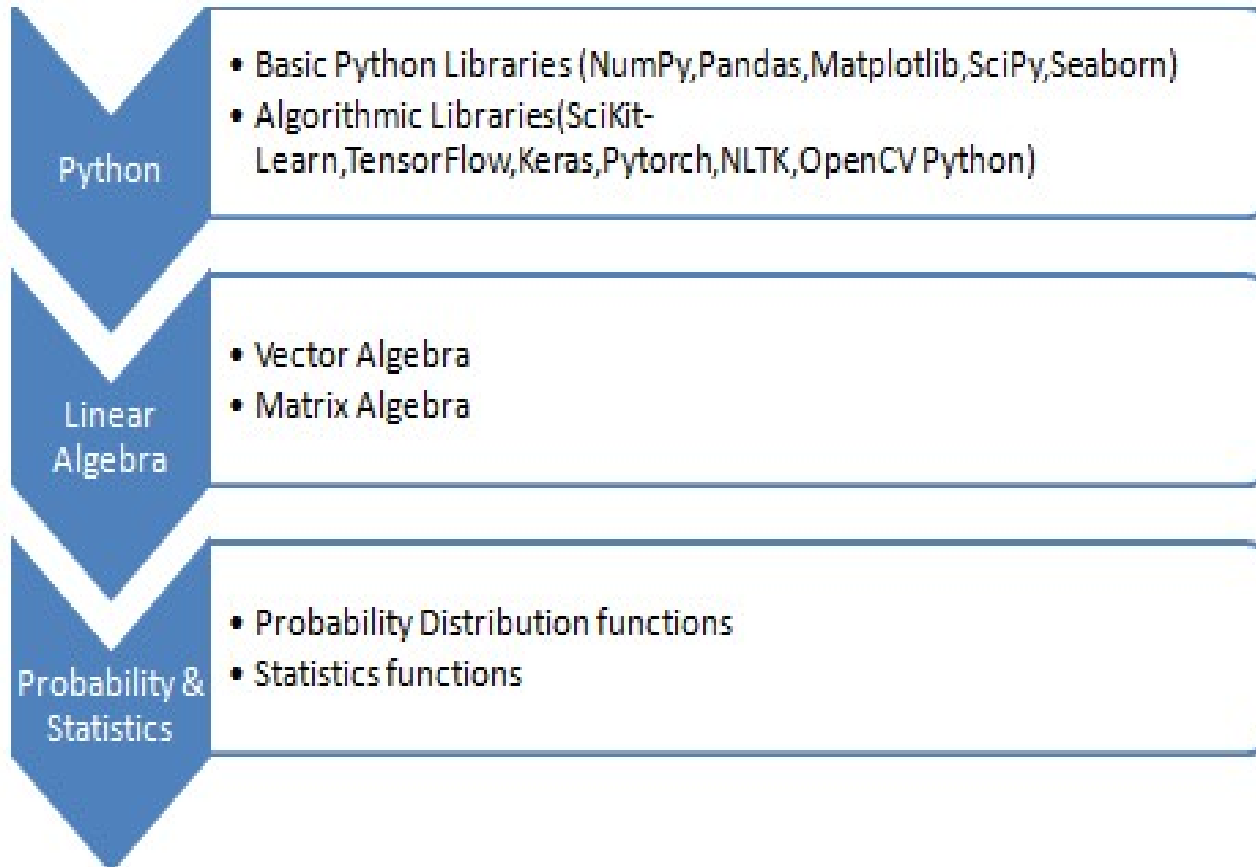
Focuses on enabling computers to perform tasks without explicit programming.

## **Deep Learning**

A subset of machine learning based on artificial neural networks.



# 1. Basic Level



optimization  
techniques

- Gradient Descent, Stochastic Gradient Descent (SGD), Adaptive Gradient, Adam

Supervised  
ML Algorithms

- Linear, Multi Regression, Logistic Regression,
- Naive Bayes, SVM, Random Forest

UnSupervised  
ML Algorithms

- K-means clustering, KNN (k-nearest neighbors), Principle Component Analysis, Singular value decomposition, T-SNE, U-MAP, PaCMAP

# Types of Machine Learning – At a Glance

## Supervised Learning

- Makes machine learn explicitly
- Data with clearly defined output is given
- Direct feedback is given
- Predicts outcome/future
- Resolves classification and regression problems



## Unsupervised Learning

- Machine understands the data (Identifies patterns/structures)
- Evaluation is qualitative or indirect
- Does not predict/find anything specific

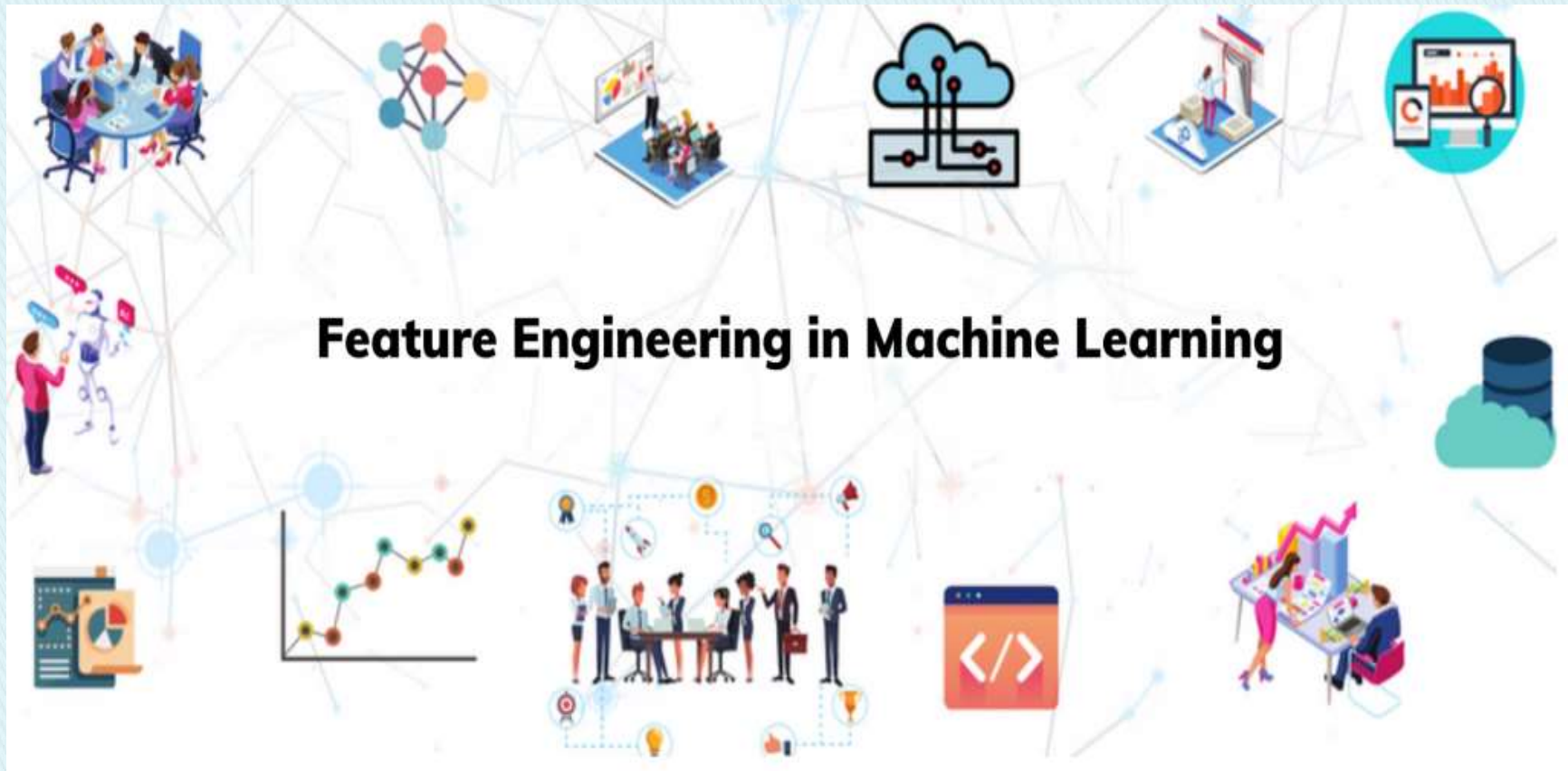


## Reinforcement Learning

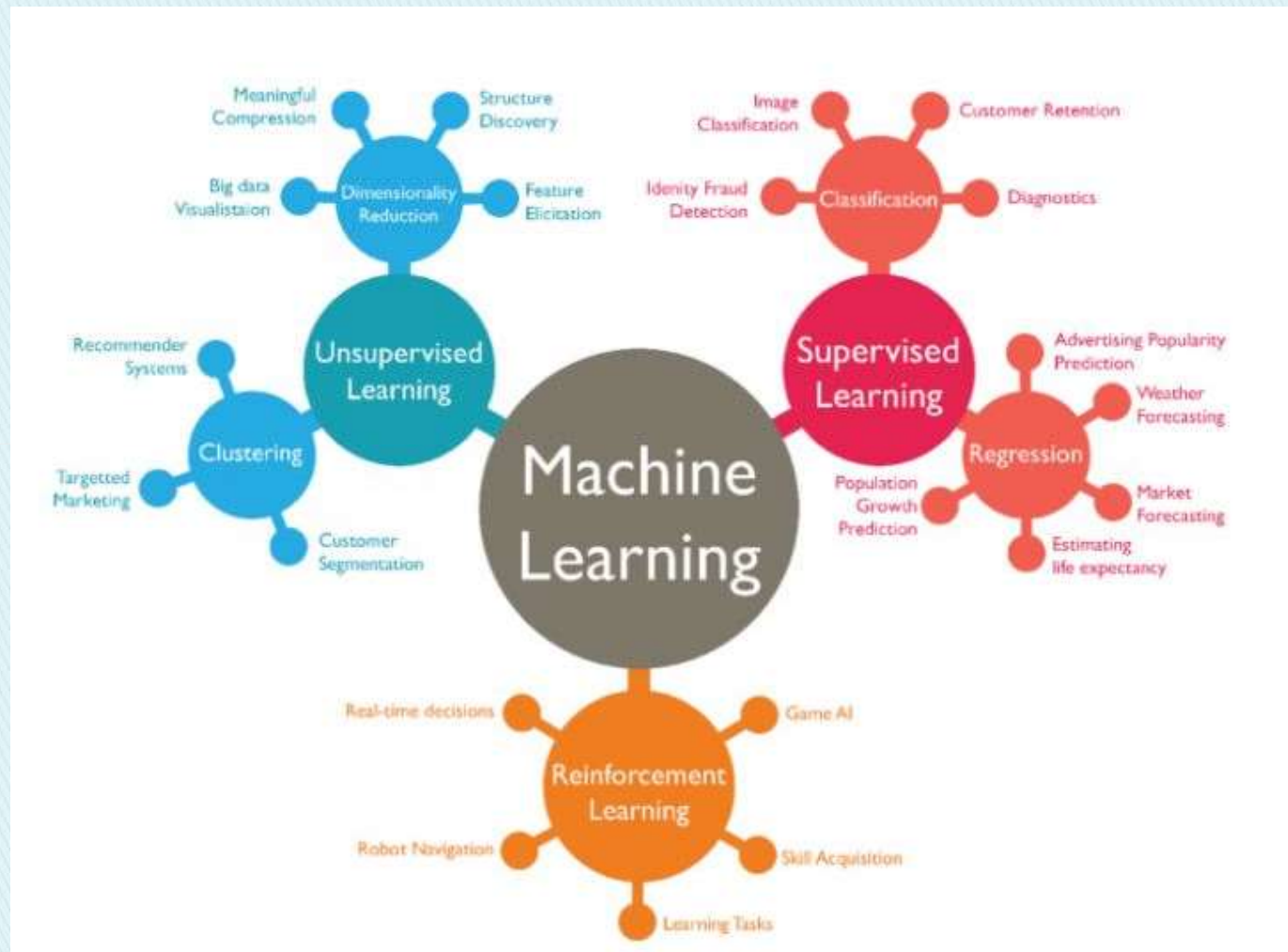
- An approach to AI
- Reward based learning
- Learning from +ve & +ve reinforcement
- Machine learns how to act in a certain environment
- To maximize rewards



# Feature Engineering



# ALGO PROFESSOR ML SYLLABUS



## 2)Intermediate Level

### ▶ Basic Level + All Deep Learning Models

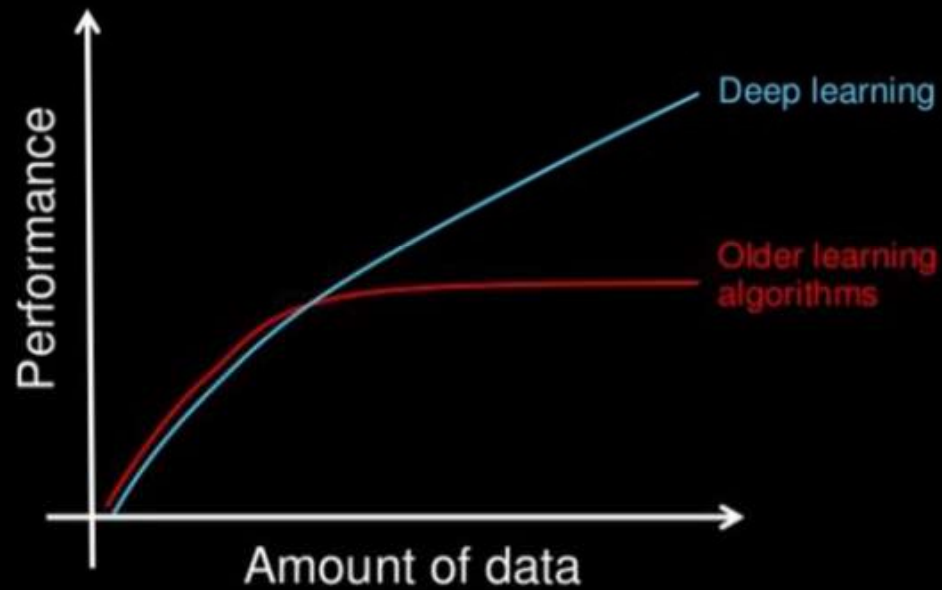
- Convolutional Neural Networks (CNNs)
- Long Short Term Memory Networks (LSTMs)
- Recurrent Neural Networks (RNNs)
- Generative Adversarial Networks (GANs)
- Radial Basis Function Networks (RBFNs)
- Multilayer Perceptrons (MLPs)
- Self Organizing Maps (SOMs)
- Deep Belief Networks (DBNs)



# Deep Learning Algorithms

- Convolutional Neural Networks (CNNs)
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## Why deep learning

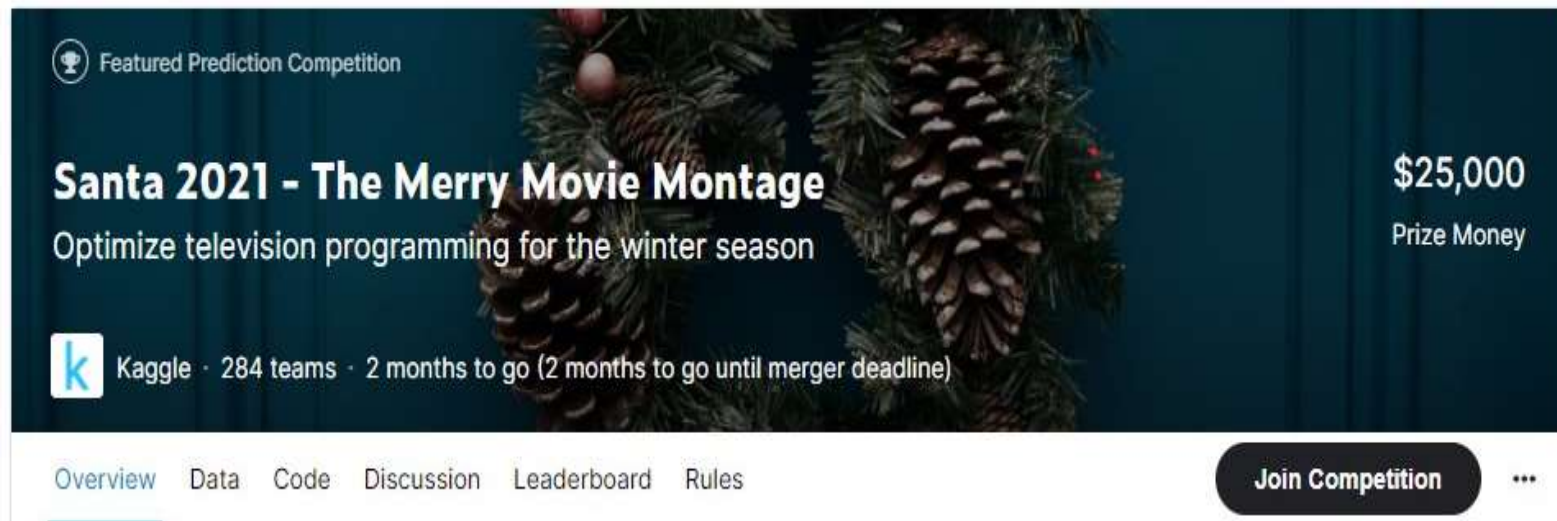


How do data science techniques scale with amount of data?

Source: Google

# 3) Advance Level

- ▶ Intermediate Level + kaggle competitions  
machine learning + Research Publication



The image shows a screenshot of a Kaggle competition page. At the top left, there is a 'Featured Prediction Competition' badge. The main title is 'Santa 2021 - The Merry Movie Montage' with a subtitle 'Optimize television programming for the winter season'. To the right, it displays '\$25,000 Prize Money'. Below the title, there is a Kaggle logo and text indicating '284 teams' and '2 months to go (2 months to go until merger deadline)'. At the bottom, there is a navigation menu with 'Overview', 'Data', 'Code', 'Discussion', 'Leaderboard', and 'Rules'. A 'Join Competition' button is visible on the right side of the navigation bar.

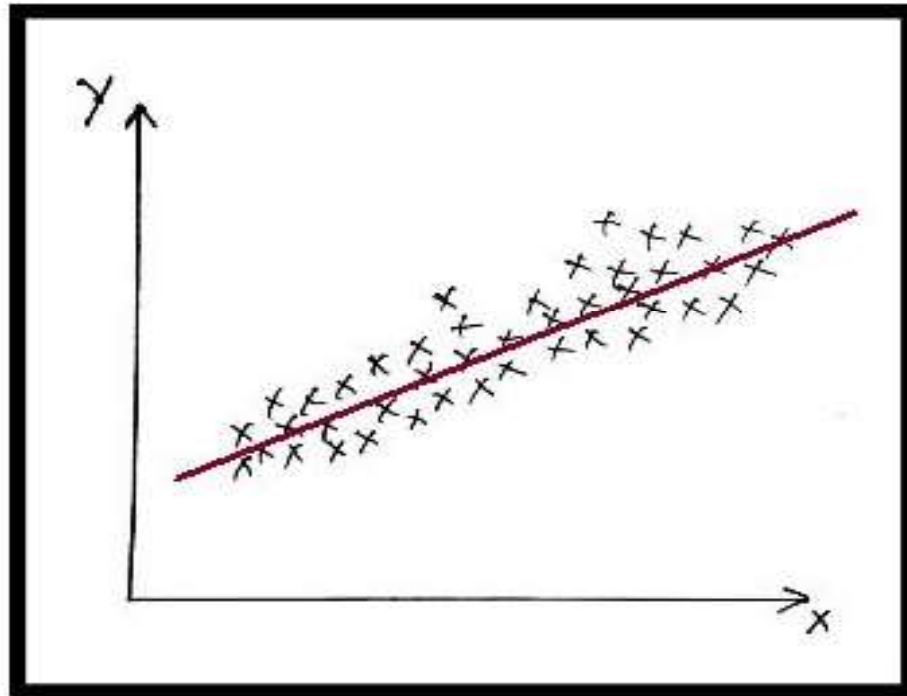
## 4) Innovative Level

*Not to be a job seeker, but  
to be a job creator*

# ML Program Learning Methodology

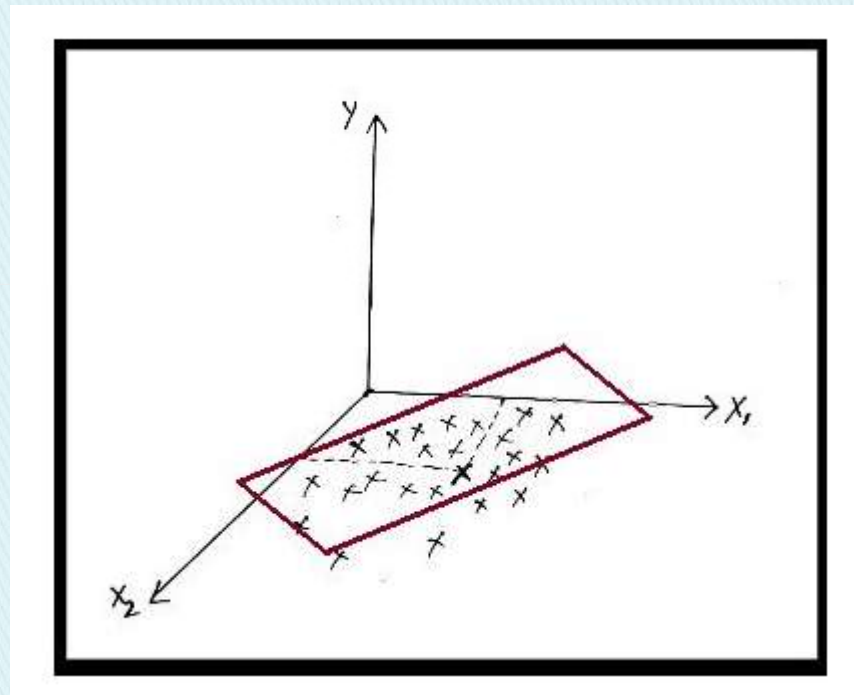
- ▶ Geometrical Intuition
- ▶ Mathematical Intuition
- ▶ Probabilistic Intuition
- ▶ Programming Intuition( Using Python)
- ▶ Research Papers Intuition Ideas
- ▶ Algo Professor Intuition Ideas

# Geometrical Intuition-2D





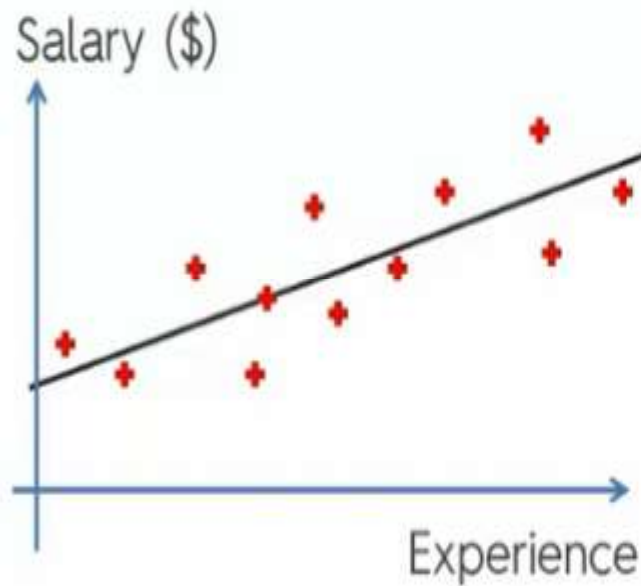
# Geometrical Intuition-3D





# Mathematical Intuition

Simple Linear Regression:

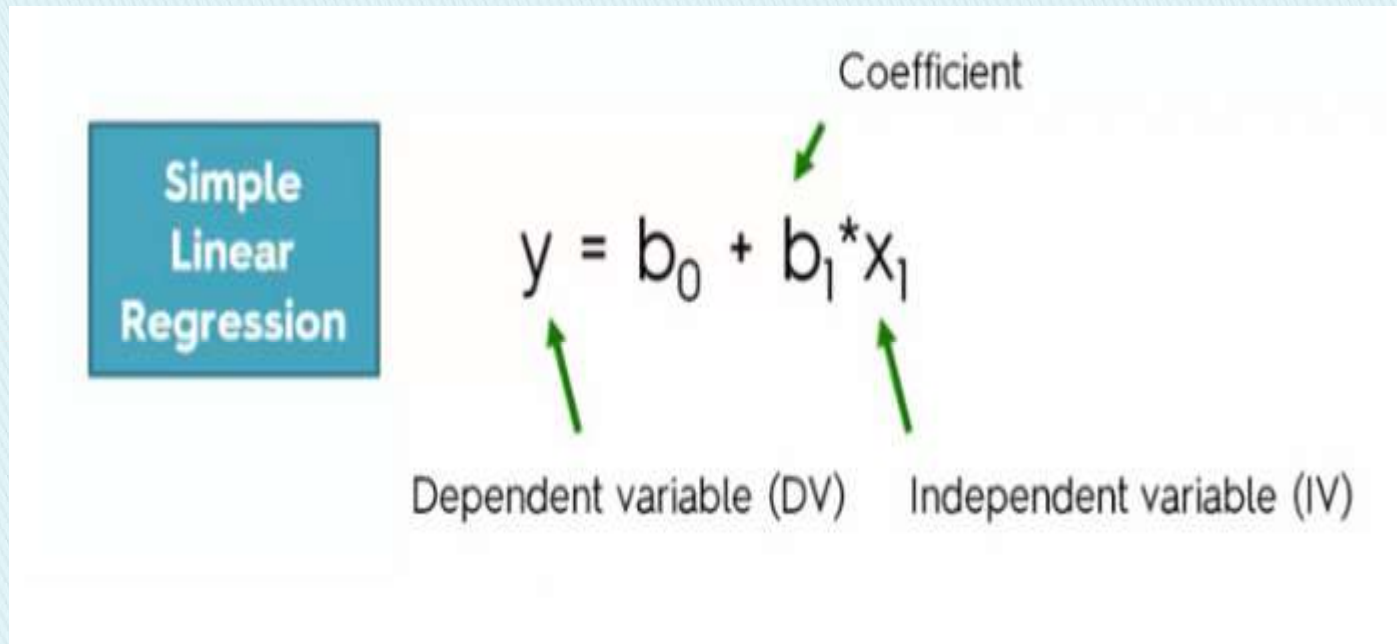


$$y = b_0 + b_1 * x$$



$$\text{Salary} = b_0 + b_1 * \text{Experience}$$

# Mathematical Intuition



# Probabilistic Intuition

## Prediction of Poisson Regression

Once we have a point estimate for  $\beta$ , we can define the distribution for our outcome variable:

$$Y \sim \text{Poisson}(\exp\{\beta_0 + \beta_1 x_1 + \dots + \beta_p x_p\})$$

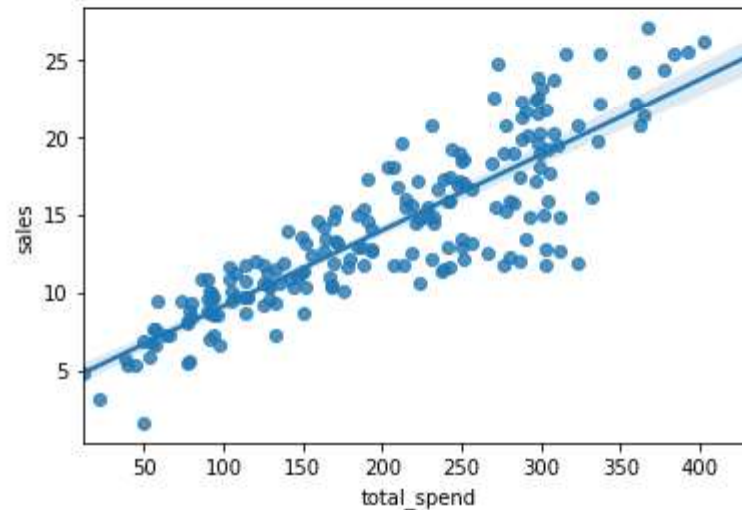
and correspondingly our point prediction of  $\hat{y}_i$  given its explanatory variables:

$$\hat{y}_i = E(y_i) = \exp\{\beta_0 + \beta_1 x_{i1} + \dots + \beta_p x_{ip}\}$$

# Programming Intuition( Using Python)

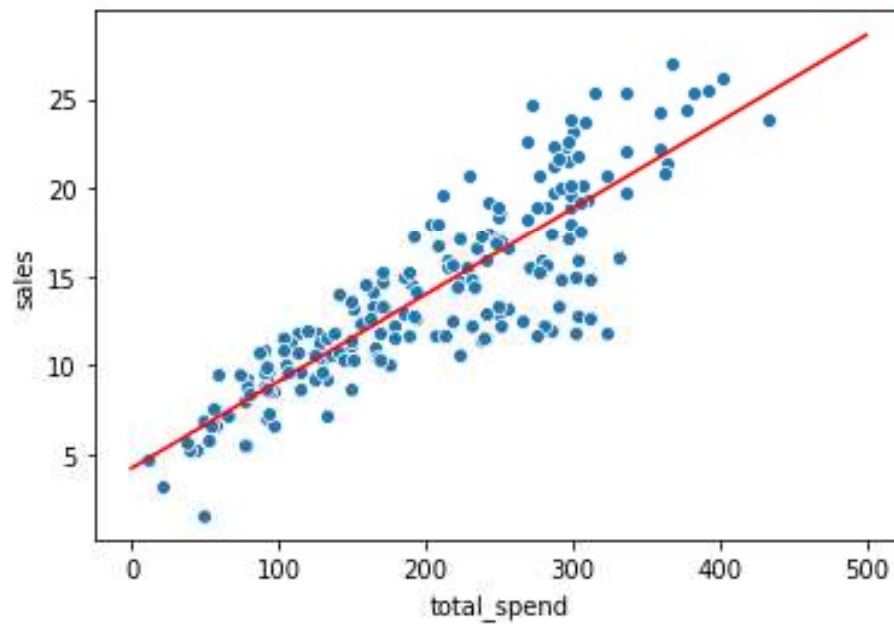
```
In [13]: # Basically, we want to figure out how to create this line  
sns.regplot(x='total_spend',y='sales',data=df)
```

```
Out[13]: <AxesSubplot:xlabel='total_spend', ylabel='sales'>
```



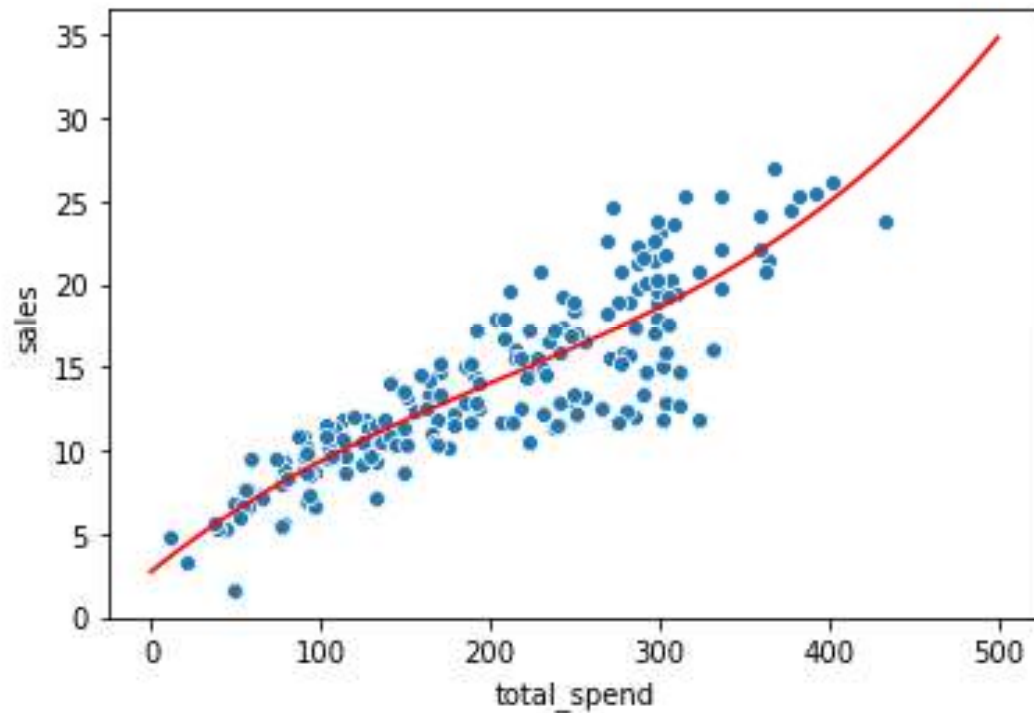
```
In [24]: sns.scatterplot(x='total_spend',y='sales',data=df)
plt.plot(potential_spend,predicted_sales,color='red')
```

```
Out[24]: [<matplotlib.lines.Line2D at 0x1a948dc6bc8>]
```

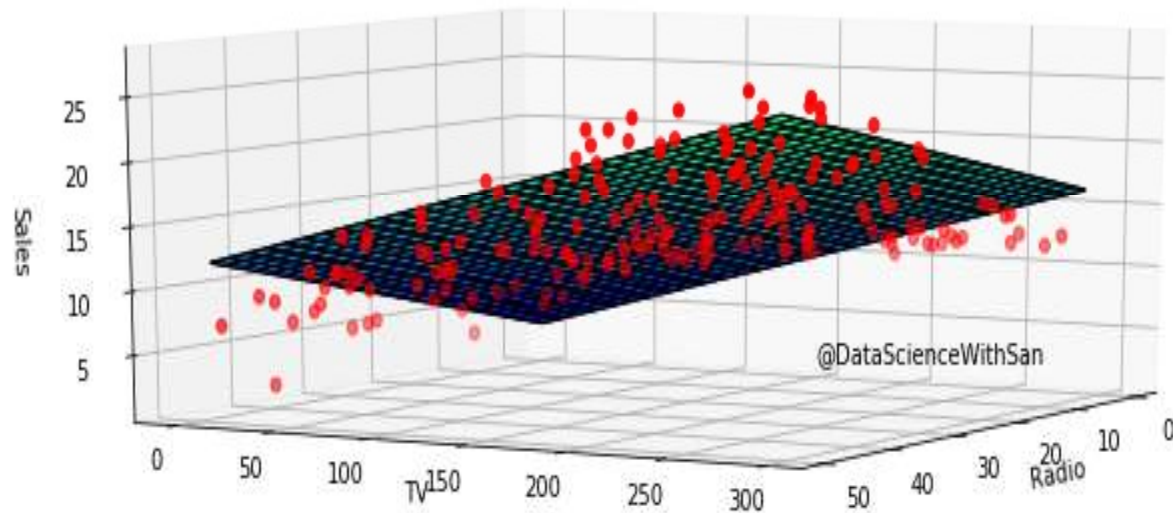


```
In [40]: sns.scatterplot(x='total_spend',y='sales',data=df)
plt.plot(potential_spend,predicted_sales,color='red')
```

```
Out[40]: [<matplotlib.lines.Line2D at 0x1a945c52908>]
```



### Regression: Sales ~ TV & radio Advertising



# Research Papers Intuition Ideas

## Dimension Reduction Algorithms

By

Algo Professor

Dr S.Satyanarayana PhD .,FARSC

S.NO	Dimension Reduction Algorithms	Inventor & Year	Global Data Preserve	Local Data Preserve	Linear /Non Linear
1	Principal Component Analysis(PCA) [Linear Algebra ]	Karl Pearson (1901)	✓		Linear
2	t-distributed Stochastic Neighbor Embedding (t-SNE) [Probability+ Graph Theory]	Geoffery Hinton(2008)		✓	<b>Non Linear</b>
3	LargeVis [Graph Theory]	Jian Tang(2016)		✓	<b>Non Linear</b>
4	Uniform Manifold Approximation and Projection (U MAP) [R-Manifold+ Topology +Fuzzy Graph]	Leland McInnes(2018)		✓	<b>Non Linear</b>
5	Tri MAP [Graph Theory]	Eshon Amid (2019)	✓	✓	<b>Non Linear</b>
6	Pair wise Controlled Manifold Approximation Projection (PaCMAP) [Topology+ Graph Theory]	Yingfan Wand (2020)	✓	✓	<b>Non Linear</b>



- PROGRAM OUT COMES :**
- 1) To Be Expertise From Basics to Advance in Mathematics, Statistical Methods, Python/ R Programming**
  - 2) To Create and Evaluate Basics to Advance AI & ML All Latest Algorithms**
  - 3) To Solve Any Top (Kaggle) Basics to Advance Data Science Competitions**
  - 4) To Publish Good Research Paper In Top IEEE Transactions ,SCI index Journals**
  - 5) Innovative Ideas For Start-up AI ,ML & Fin Tech Companies**

- 1. Collection of data:** Data for machine learning is collected directly from structured source data, web scrapping, API, chat interaction, and so on, as machine learning can work on both structured and unstructured data (voice, image, and text).
- 2. Data preparation and missing/outlier treatment:** Data is to be formatted as per the chosen machine learning algorithm; also, missing value treatment needs to be performed by replacing missing and outlier values with the mean/median, and so on.
- 3. Data analysis and feature engineering:** Data needs to be analyzed in order to find any hidden patterns and relations between variables, and so on. Correct feature engineering with appropriate business knowledge will solve 70 percent of the problems. Also, in practice, 70 percent of the data scientist's time is spent on feature engineering tasks.
- 4. Train algorithm on training and validation data:** Post feature engineering, data will be divided into three chunks (train, validation, and test data) rather than two (train and test) in statistical modeling. Machine learning are applied on training data and the hyper parameters of the model are tuned based on validation data to avoid over fitting.
- 5. Test the algorithm on test data:** Once the model has shown a good enough performance on train and validation data, its performance will be checked against unseen test data. If the performance is still good enough, we can proceed to the next and final step.
- 6. Deploy the algorithm:** Trained machine learning algorithms will be deployed on live streaming data to classify the outcomes. One example could be recommender systems implemented by E-commerce websites

# For UG & PG Students OutCome

- ▶ UG 2 Year ----Internship---Code ---Github
- ▶ UG 3Year----Internship---Blog---Website
- ▶ UG 4Year---Project--Publish Paper -Scopus
  
- ▶ PG-1,2Year—Project—Paper Publish—  
Scopus/SCI/IEEE

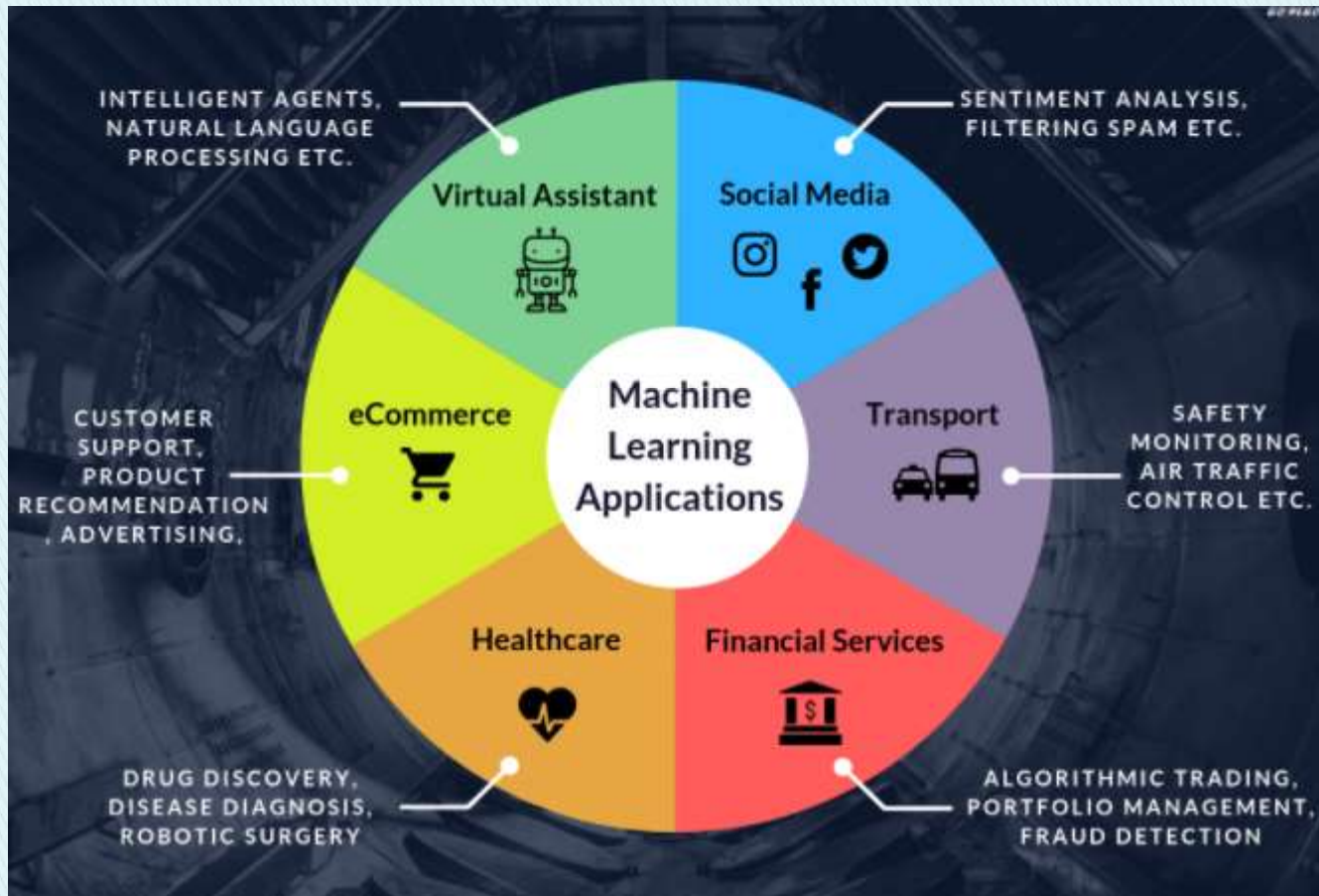
# Real Time Projects work

- ▶ Machine Learning Independent Researchers
- ▶ Machine Learning Industry Experts
- ▶ Career Transition to Machine Learning
- ▶ Data scientists

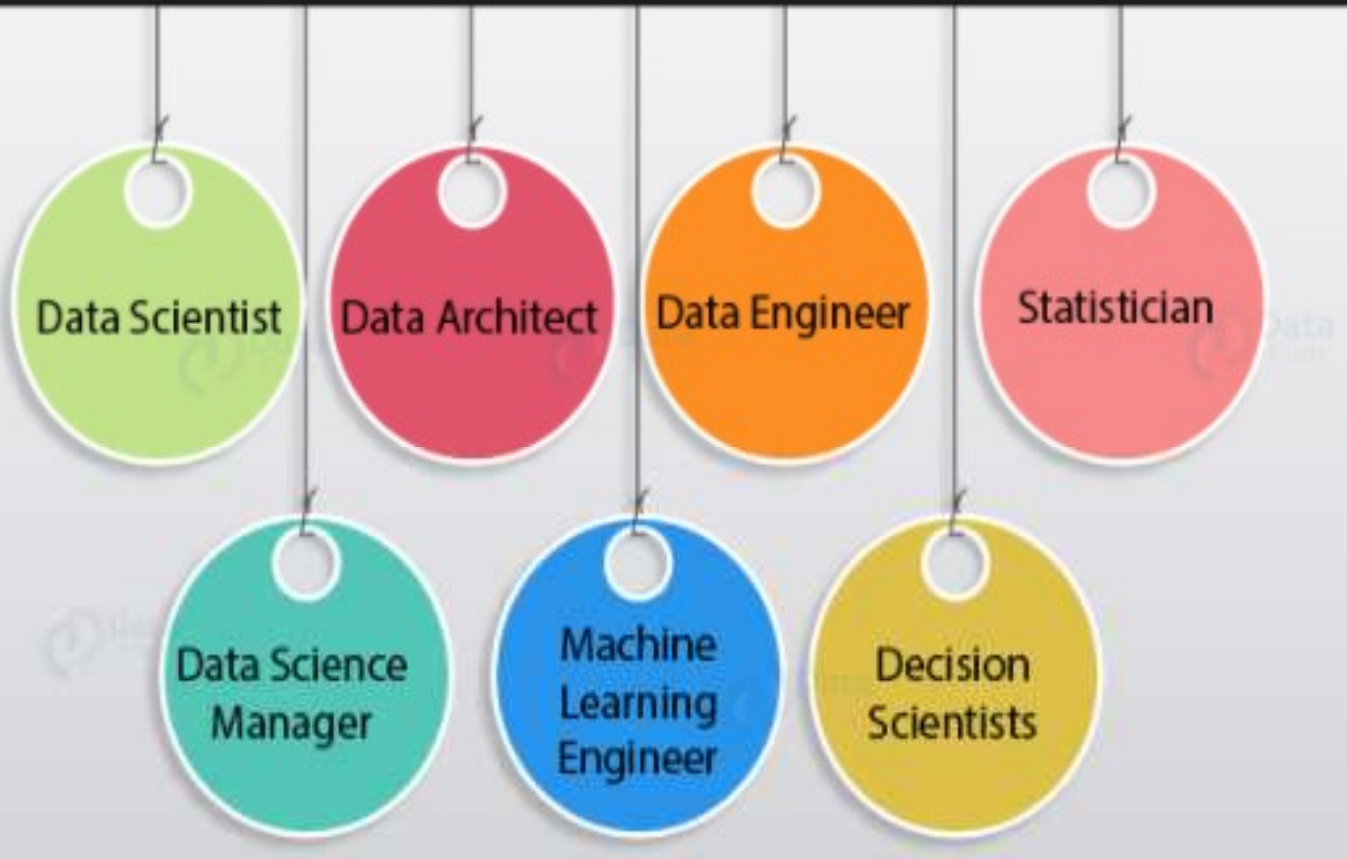
# Top ML + Allied Conferences

- ▶ For PhD., Post-Doc., University/Engineering College Professor
- ▶ NeurIPS, ICML or ICLR.(Top ML Conferences)
- ▶ ACL, EMNLP( Top NLP Conferences)
- ▶ CVPR, ICCV, PAMI, IJCV.( Top Computer Vision Conferences)
- ▶

# ML Applications – Domains



# Top Data Science Jobs



## What is the Pay by Experience Level for Machine Learning Engineers?





## Average Data Scientist, IT Salary in India

₹698,413

Avg. Salary [Show Hourly Rate](#)

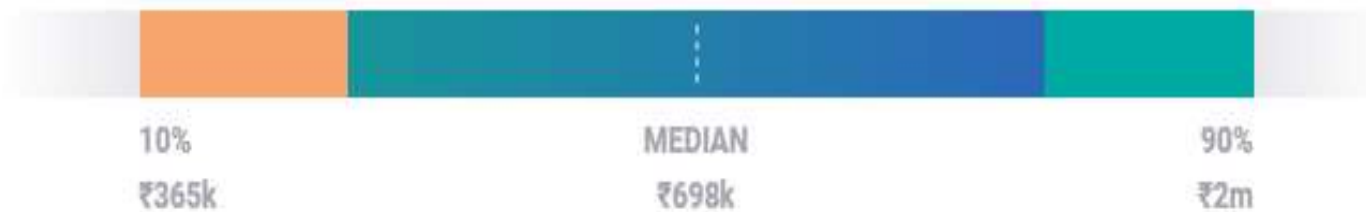
₹60,678

BONUS

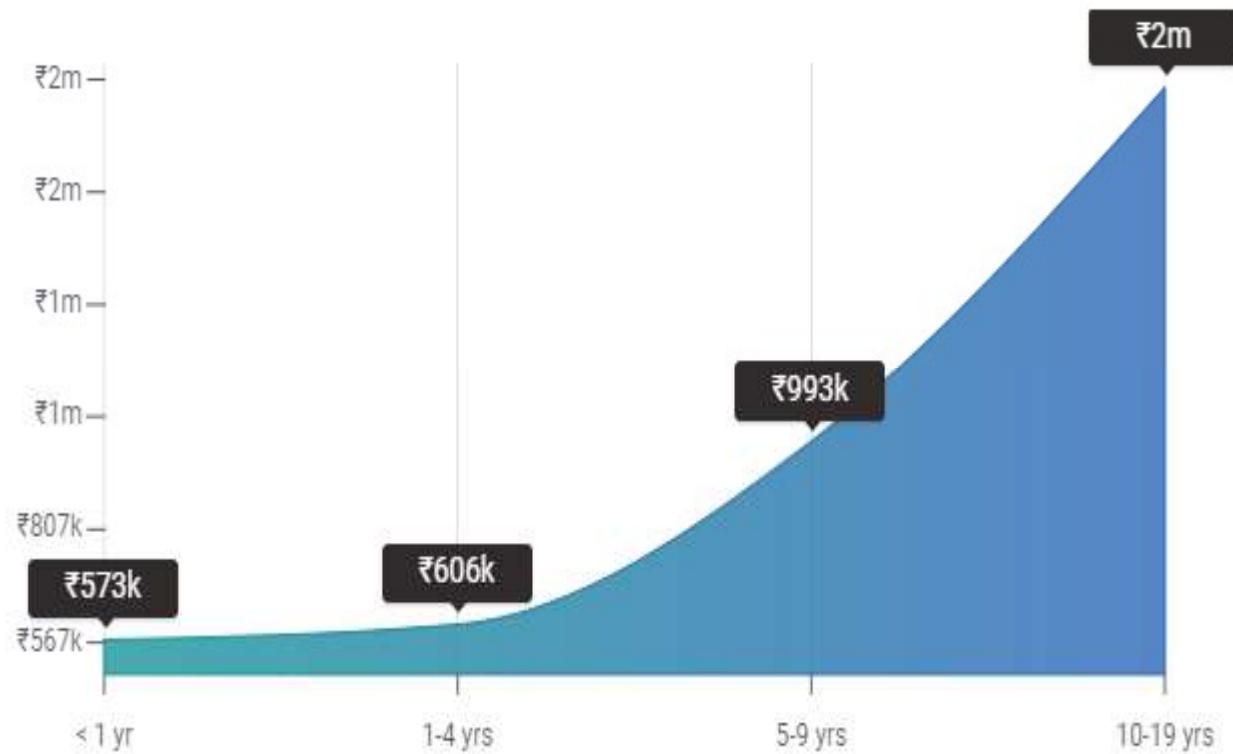
₹35,000

PROFIT SHARING

The average salary for a Data Scientist, IT in India is ₹698,413.



## How data scientist salary in India increases over experience



# Average Machine Learning Engineer Salary in India

₹691,892

Avg. Salary [Show Hourly Rate](#)

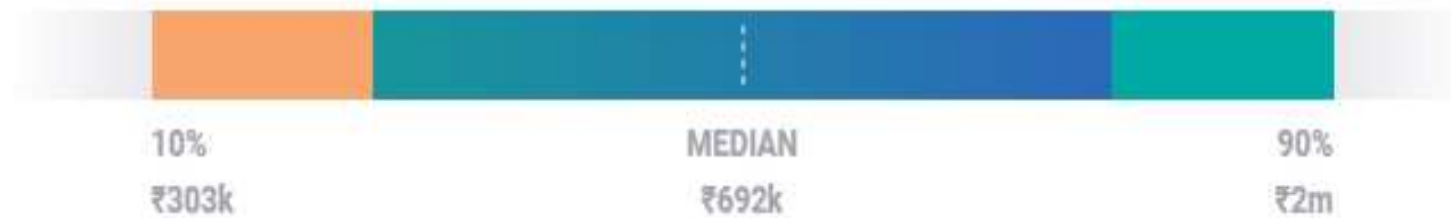
₹99,564

BONUS

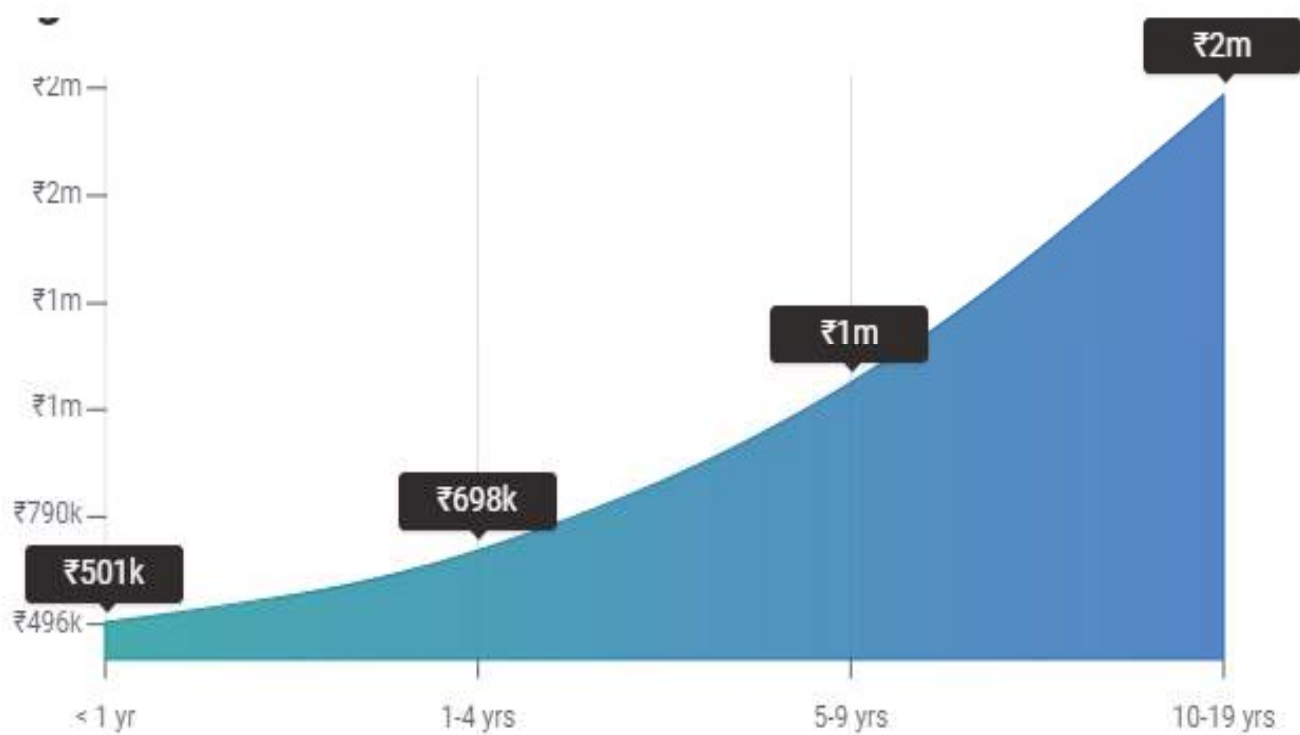
₹62,500

PROFIT SHARING

The average salary for a Machine Learning Engineer in India is ₹691,892.



How machine learning engineer salary increases over experience:





THANK YOU