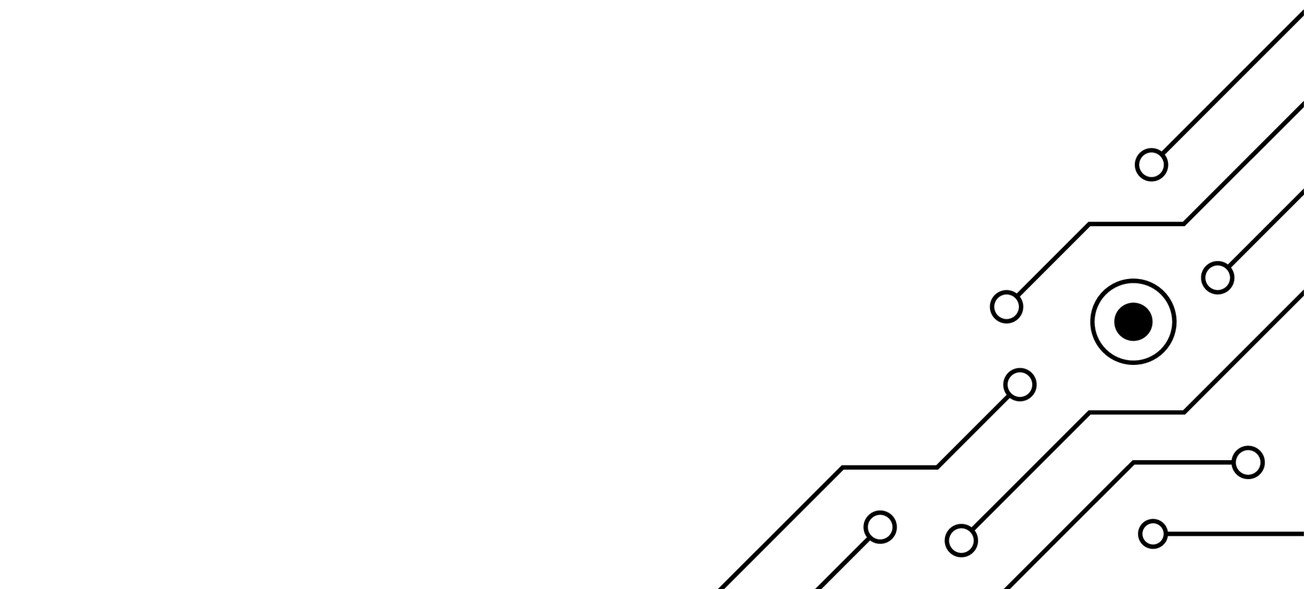
AI/ML Roadmap: Key Resources and Skills

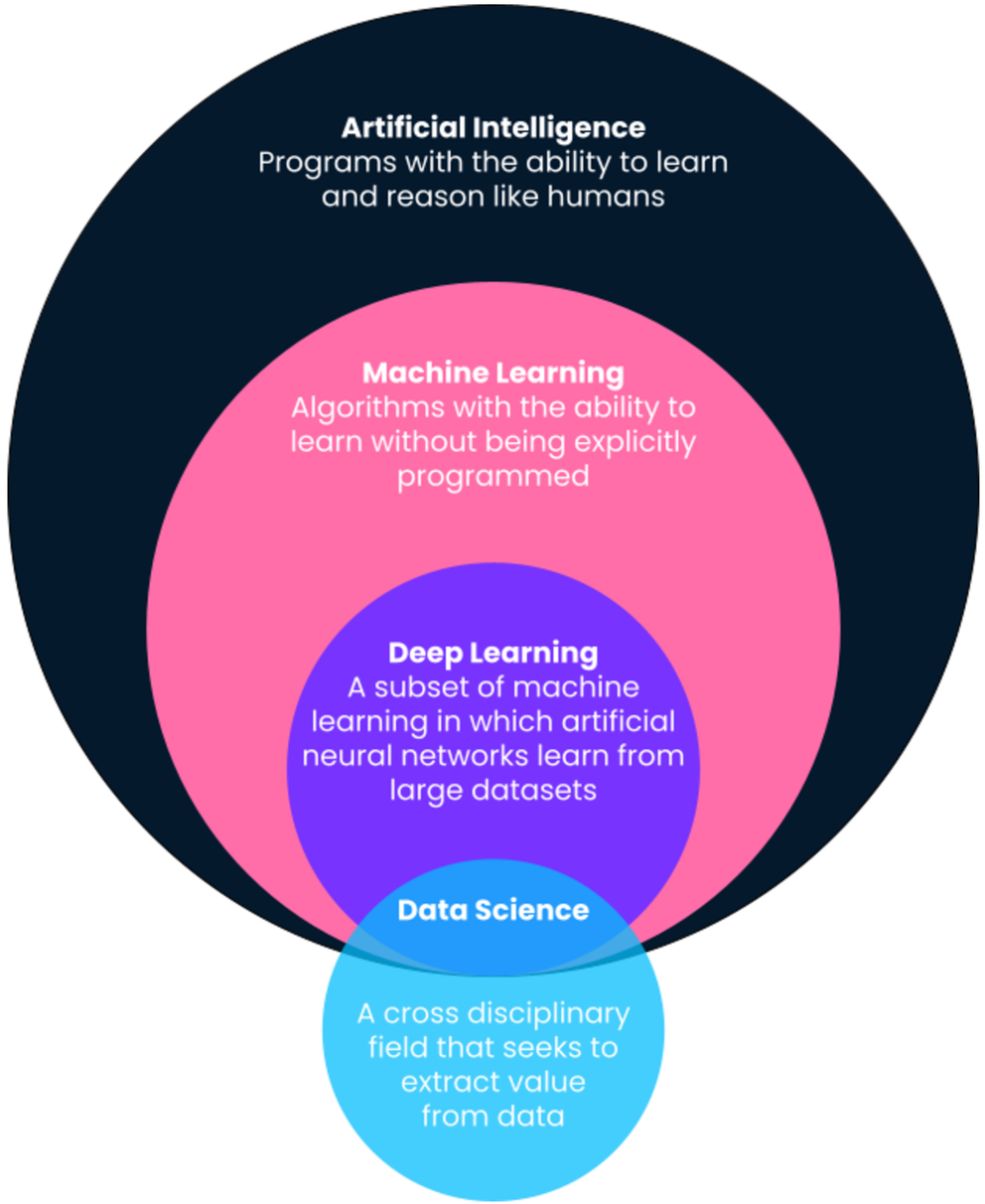
Presented By: Jyoti Pokhrel
Date: 2081/07/10

Presented In: EverdayKarma's Discord Server

Table of contents

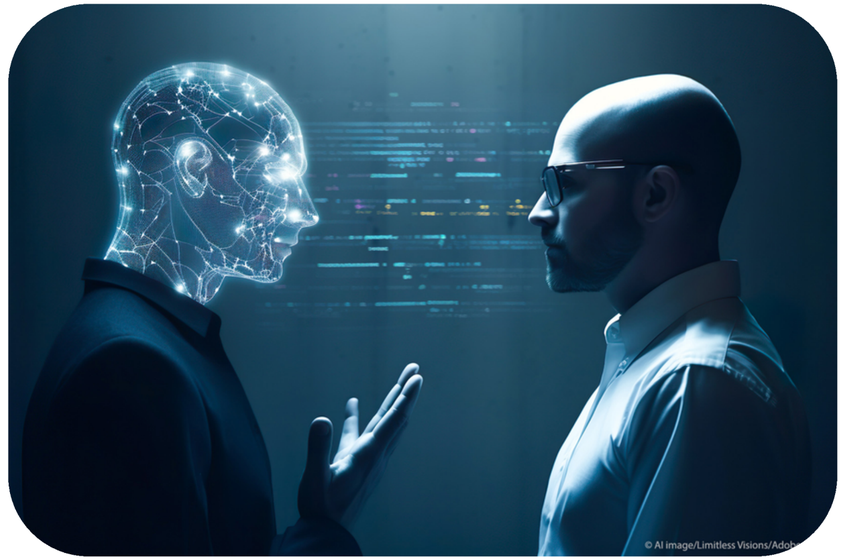


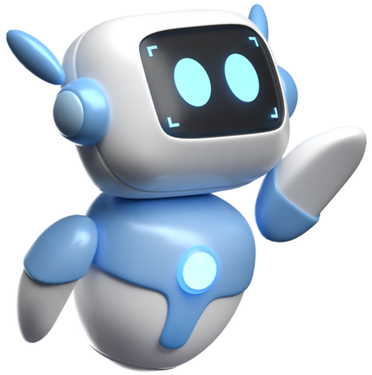
Introduction

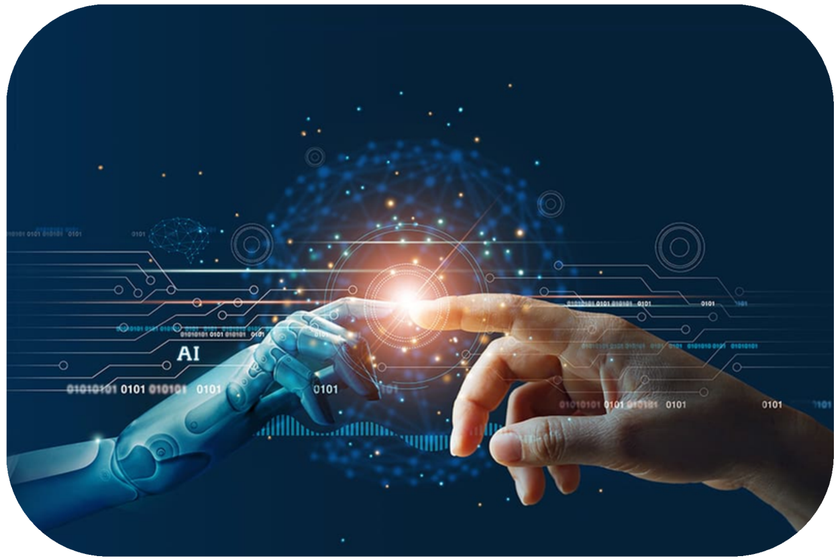


Why AI/ML?

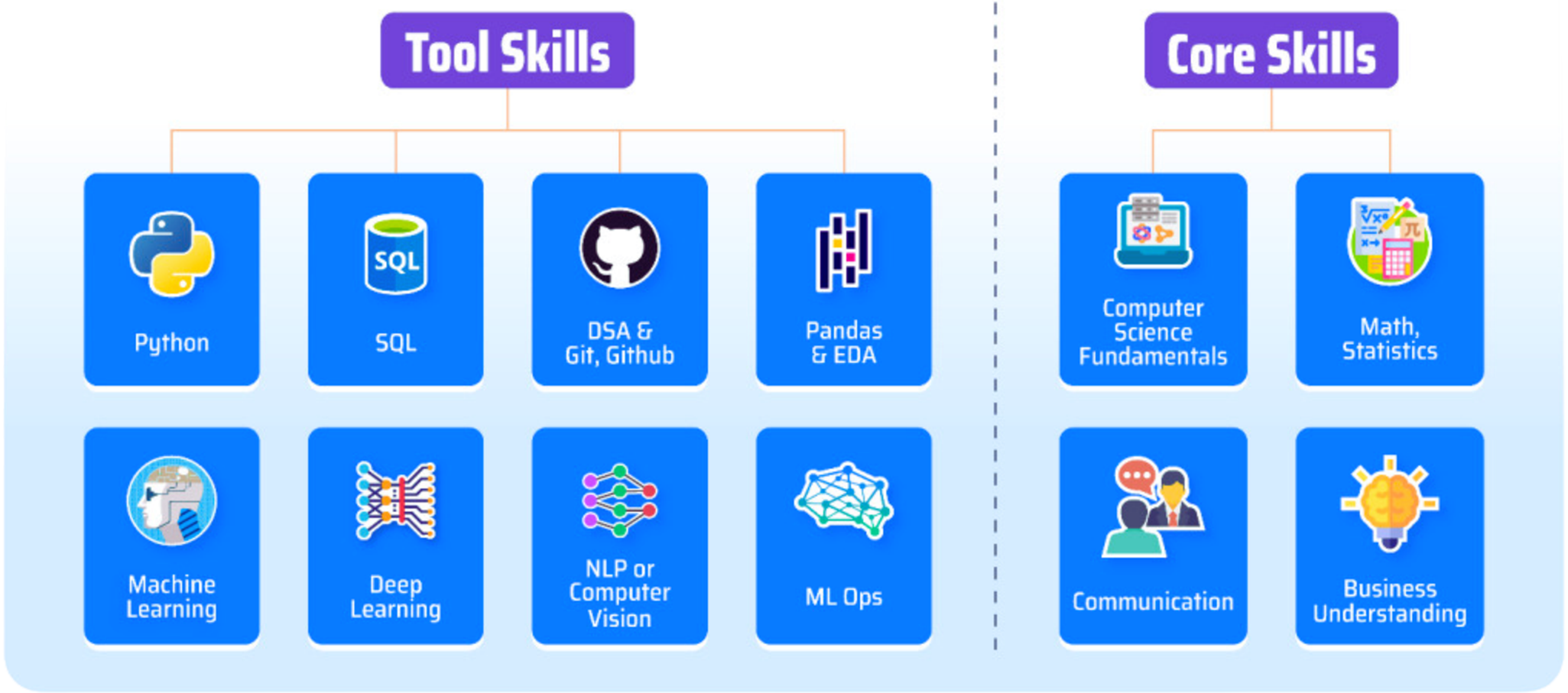
- Benefits of AI/ML
- Growing Demands for AI/ML Skills
- Future Potential







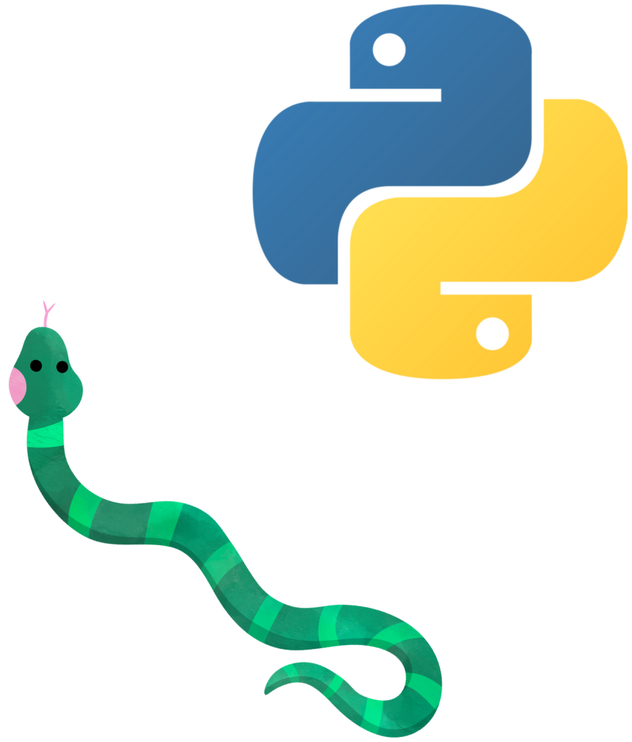
Core & Tool skills



Roadmap and key resources

1. **Beginners Python**

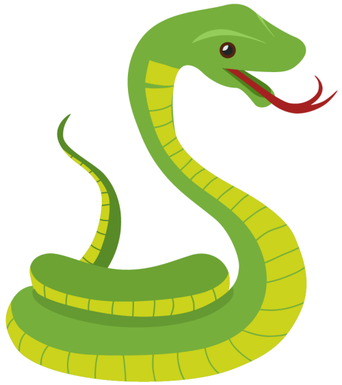
- Variables, Numbers, Strings
- Lists, Dictionaries, Sets, Tuples
- If condition, for loop
- Functions, Lambda Functions
- Modules (pip install)
- Read, Write files
- Exception handling
- Classes, Objects



Roadmap and key resources

2. DSA

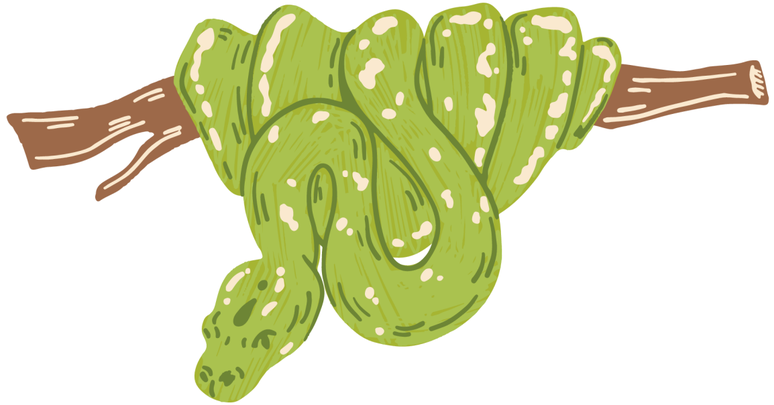
o Data structures basics, Big O notation
o Data structures: Arrays, Linked List, Hash Table, Stack, Queue
o Data structures: Tree, Graph
o Algorithms: Binary search, Bubble sort, quick sort, merge sort
o Recursion



Roadmap and key resources

3. Advanced Python

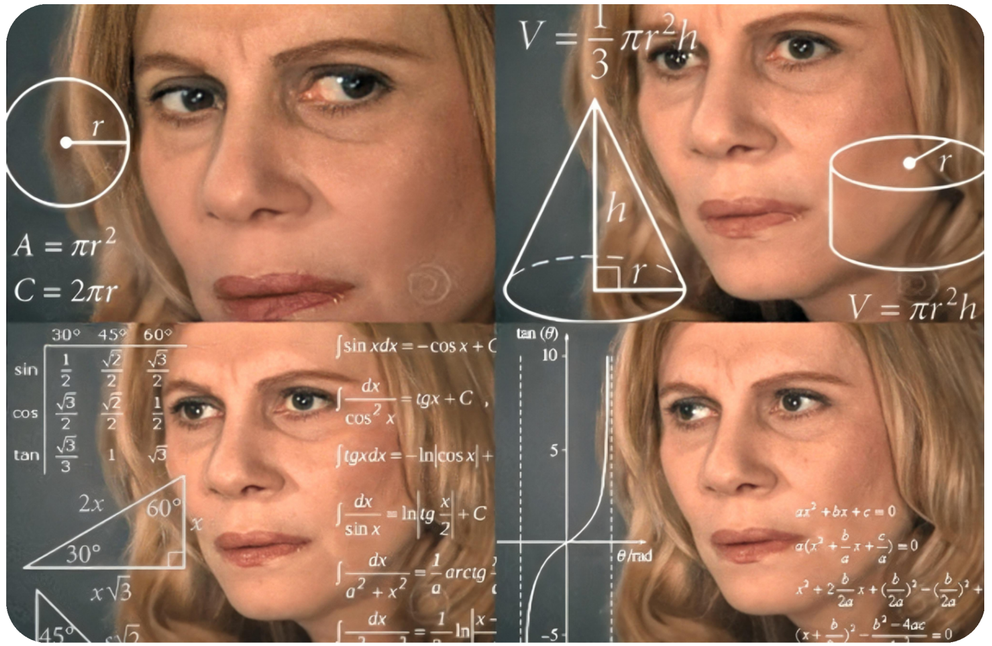
- Inheritance, Generators, Iterators
- List Comprehensions, Decorators
- Multithreading, Multiprocessing



Roadmap and key resources

4. Maths

- **Linear Algebra**: Understand vectors, matrices, transformations.
- **Calculus**: Focus on derivatives, gradients, optimization.
- **Probability and Statistics**: Probability distributions, statistical inference.



Roadmap and key resources

5. SQL

- **Basic Queries**: SELECT, WHERE, LIKE, DISTINCT, BETWEEN, GROUP BY, ORDER BY
- **Advanced Queries**: CTE, Subqueries, Window Functions
- **Joins**: Left, Right, Inner, Full
- Database creation etc

Roadmap and key resources

5. Version control git and github

- **Basic commands**: add, commit, push.
- Branches, reverting change, HEAD, Diff and Merge
- Pull requests.

Roadmap and key resources

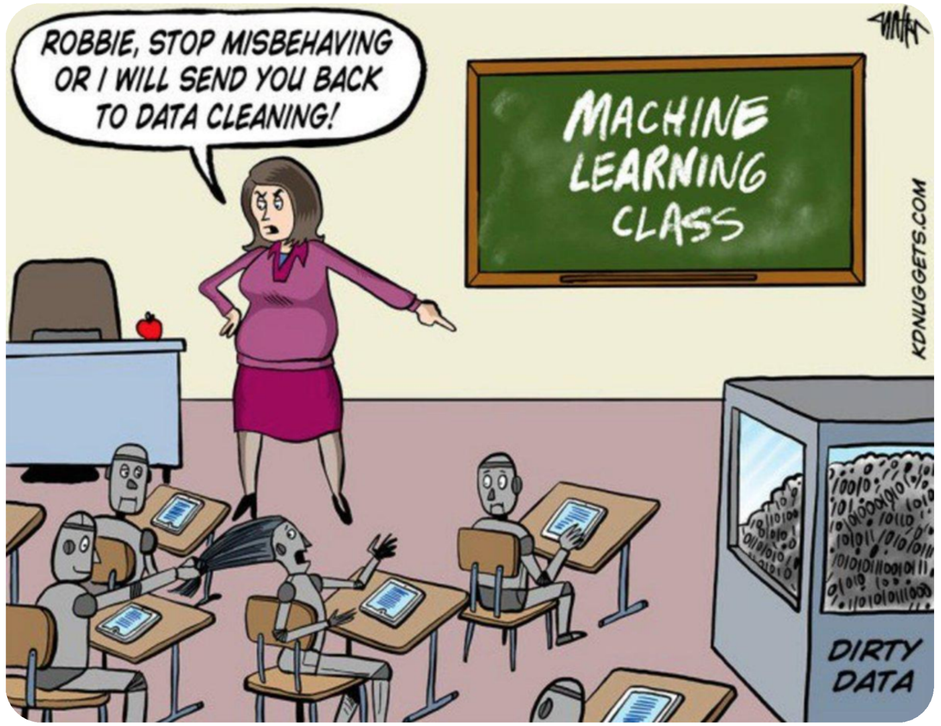
5. Python Libraries

- **NumPy**: For numerical computing (arrays, matrix operations).
- **Pandas**: Data manipulation and analysis (dataframes).
- **Scikit-learn:** Essential for implementing machine learning algorithms (classification, regression, clustering).
- **Matplotlib**: For data visualization (plots, histograms, heatmaps).

Roadmap and key resources

5. Machine learning Preprocessing

o Handling NA values, outlier treatment, data normalization
o One hot encoding, label encoding
o Train test split
o Cross validation



Roadmap and key resources

5. Machine learning: Model Building

Types of ML: Supervised, Unsupervised, Reinforcement learning

o Supervised: Regression vs Classification

o Linear models

o Nonlinear models (tree-based models)

Roadmap and key resources

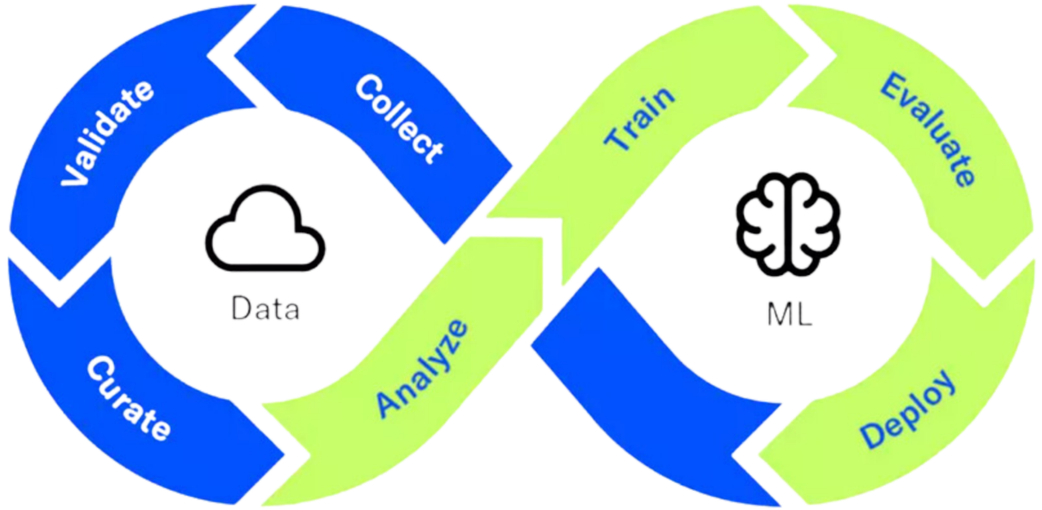
5. Machine learning: Model Building

- Model evaluation
  Regression, Classification
- Hyperparameter tunning
- Unsupervised: K means, Hierarchical clustering

Roadmap and key resources

5. MLOps

FastAPI for Python server development
o DevOps Fundamentals
o Familiarity with at least one cloud platform (AWS, Azure etc.)



kubernetes

Azure

aws

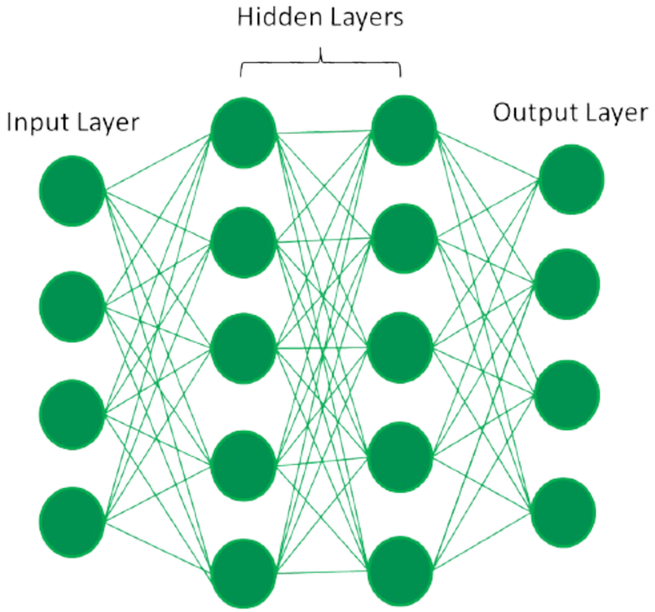
FastAPI

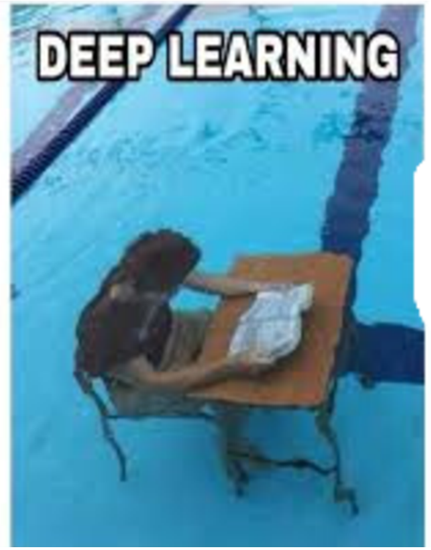
docker

Roadmap and key resources

5. Deep Learning

o What is a neural network? Forward propagation, back propagation
o Building multilayer perceptron
o Special neural network architectures
    Convolutional neural network (CNN)
    Sequence models: RNN, LSTM





Roadmap and key resources

5. NLP or Computer Vision & GenAI

Natural Language Processing (NLP):
Text presentation, Text classification,
Fundamentals of Spacy & NLTP library

Computer Vision (CV): Basic image processing technique, OpenCV

Roadmap and key resources

5. LLM & Langchain

- o What is LLM, Vector database, Embeddings?
- o RAG (Retrieval Augmented Generation)
- o Langchain framework

LangChain

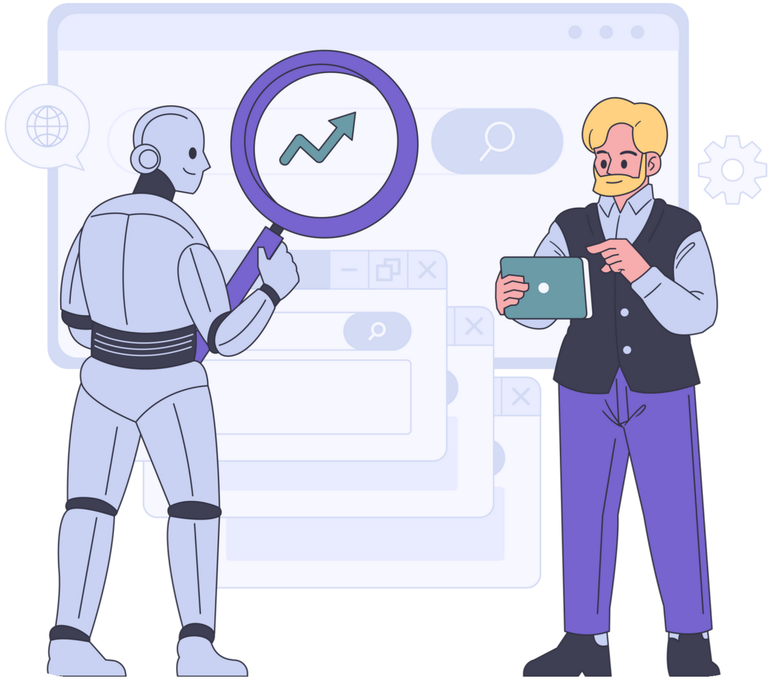
ChatGPT

Claude

Career path and job roles

1. **AI/ML Engineer**

   Training Model, Deploying Model, Integrate the Model with the rest of the software systems



2. NLP Engineer

Specilazation of an AI Engineer, Linguistic Principles, Libraries like NLTK, spaCy

3. CV Engineer

Specilazation of an AI Engineer, Computer Vision Fundamentals Libraries like OpenCV, YOLO, Focuses more on the domain like Image Processing and Video Processing

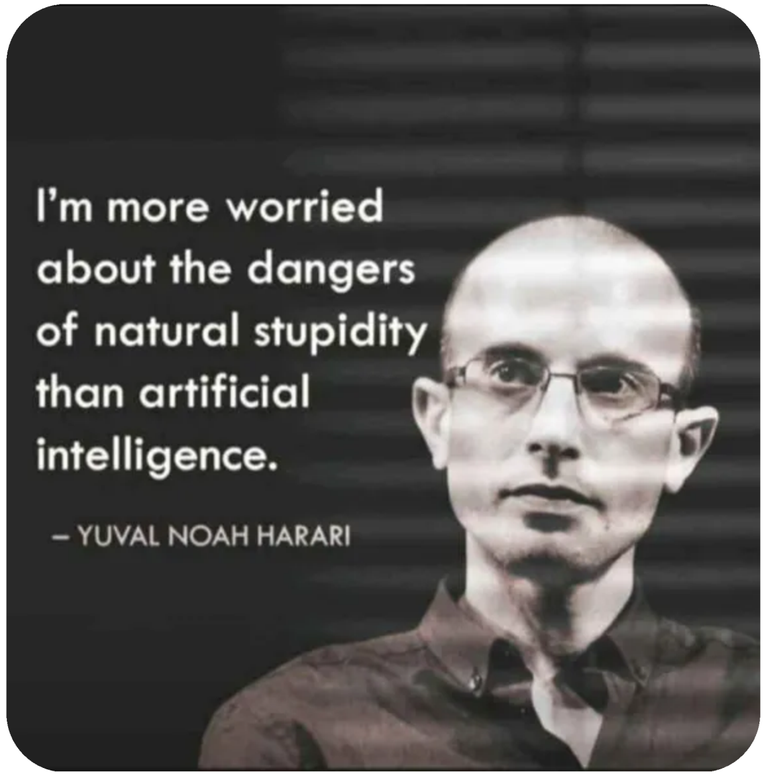
Career path and job roles

4. MLOps Engineer

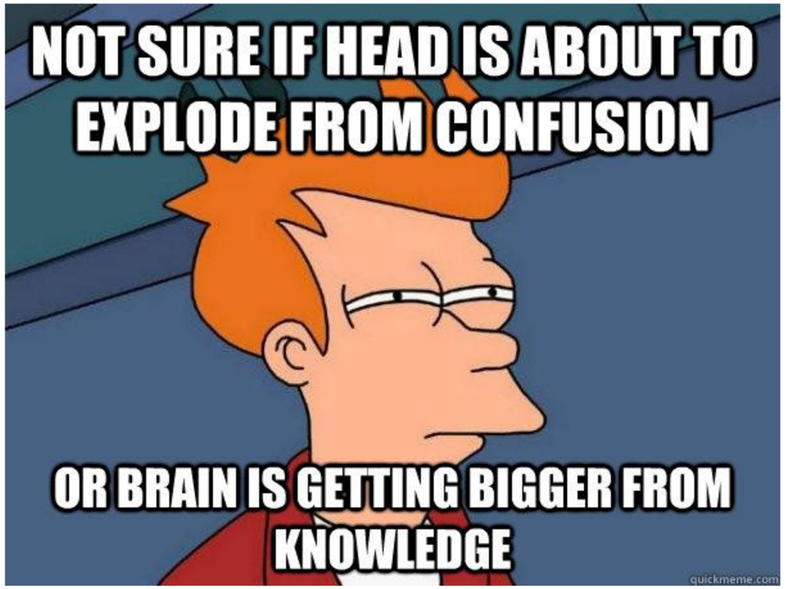
Works: CI/CD pipelines on ML Model, Docker containerization, Kubernetes, Deployment, mlflow, kubeflow, AmazonSagemaker

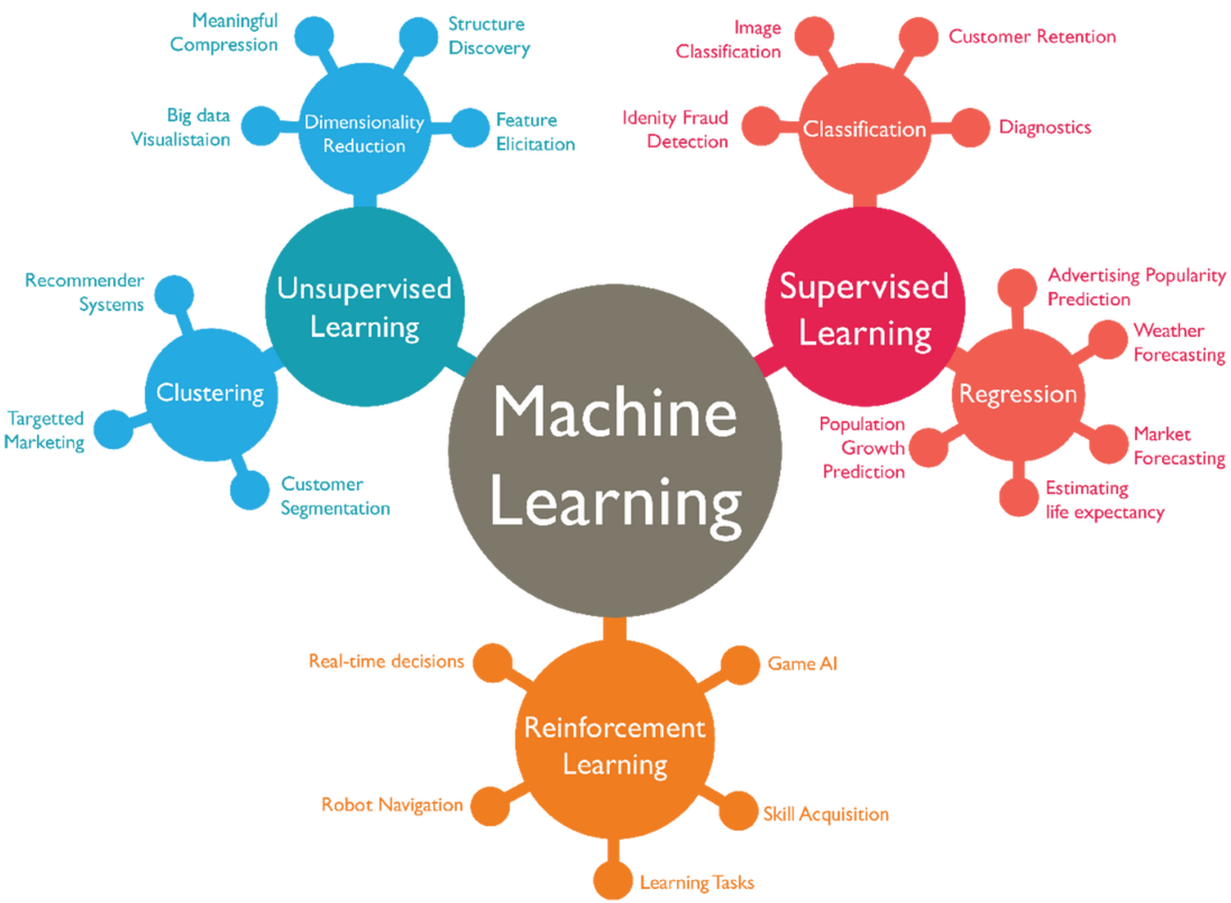
5. AI Product Manager

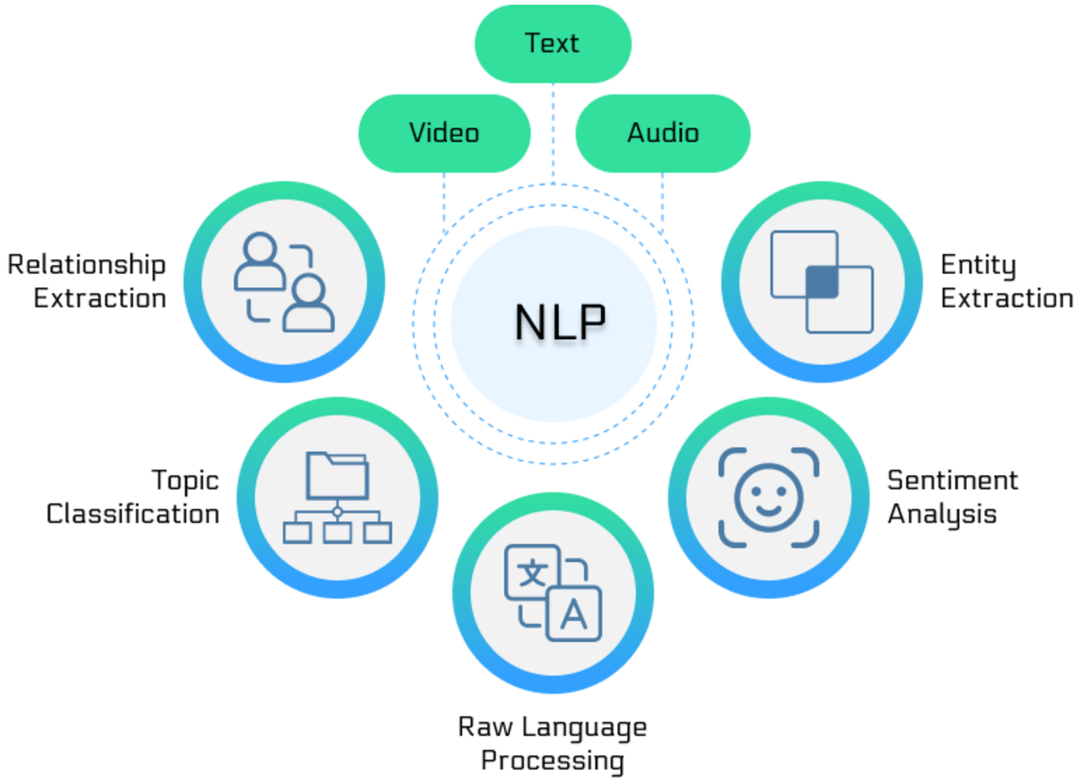
Works as a bridge between technical team an the research team
Strong Buisness understanding



Thank you!


NOT SURE IF HEAD IS ABOUT TO EXPLODE FROM CONFUSION
OR BRAIN IS GETTING BIGGER FROM KNOWLEDGE
quickmeme.com


Machine Learning
Unsupervised Learning
Dimensionality Reduction
Meaningful Compression
Structure Discovery
Big data Visualistaion
Feature Elicitation
Clustering
Recommender Systems
Targetted Marketing
Customer Segmentation
Supervised Learning
Classification
Image Classification
Customer Retention
Idenity Fraud Detection
Diagnostics
Regression
Advertising Popularity Prediction
Weather Forecasting
Population Growth Prediction
Market Forecasting
Estimating life expectancy
Reinforcement Learning
Real-time decisions
Game AI
Robot Navigation
Skill Acquisition
Learning Tasks


Text
Video
Audio
NLP
Relationship Extraction
Entity Extraction
Topic Classification
Sentiment Analysis
Raw Language Processing