AI/ML

CURRICULUM

NITYA CLOUDETECH

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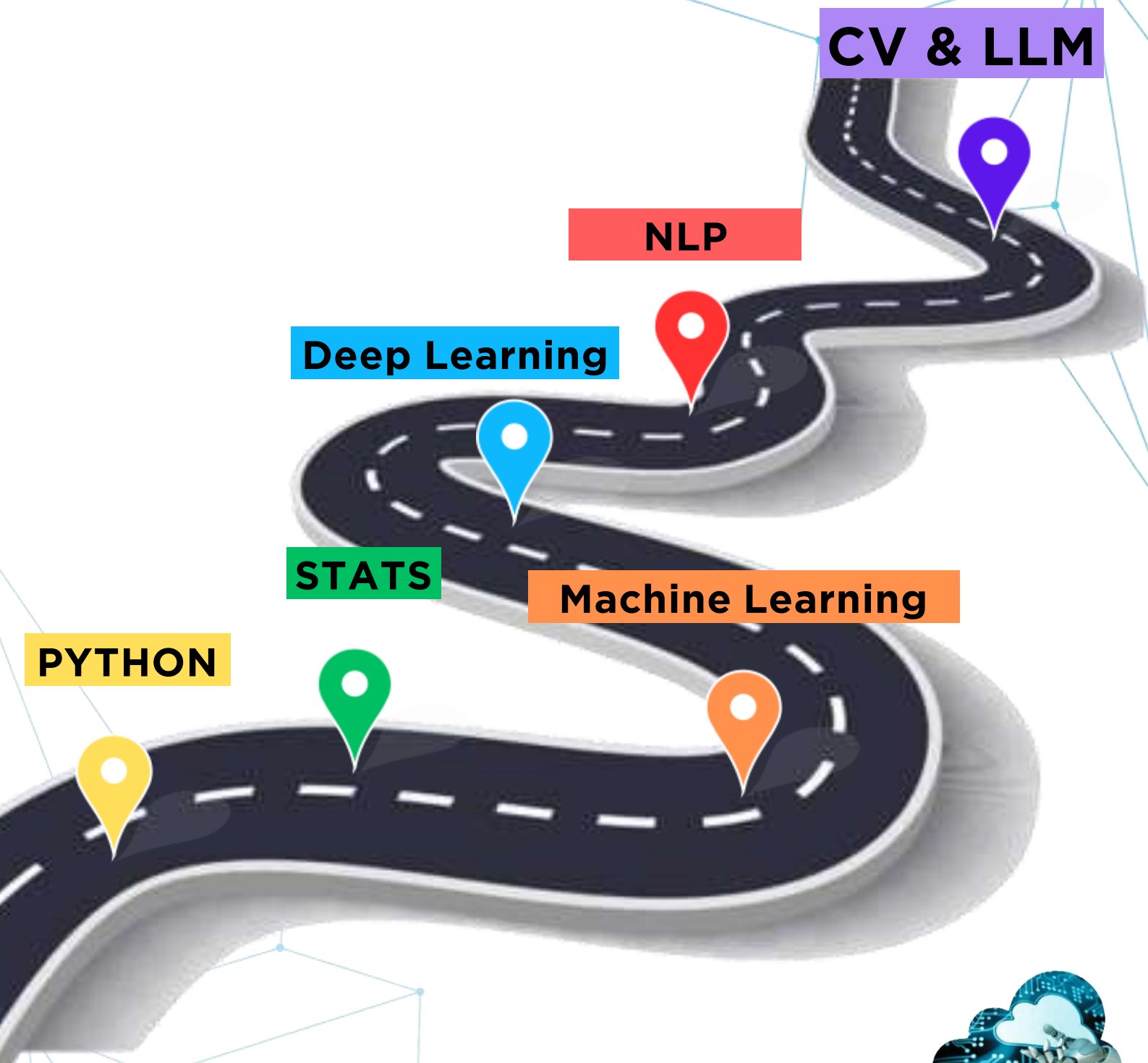
AI/ML
ROADMAP



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PYTHON 1

- **PYTHON BASICS**: VARIABLES, DATA TYPES, LOOPS, AND CONDITIONAL STATEMENTS
- **ADVANCED PYTHON:** FUNCTIONS, MODULES, FILE HANDLING, ERROR HANDLING
- **OBJECT-ORIENTED PROGRAMMING (OOPS):** CLASSES, OBJECTS, INHERITANCE, POLYMORPHISM
- **NUMPY:** ARRAYS, ARRAY OPERATIONS, BROADCASTING
- **PANDAS**: DATAFRAMES, DATA CLEANING, MERGING, GROUPING, AND AGGREGATIONS

DATA WAREHOUSING

- INTRODUCTION TO DATA WAREHOUSING CONCEPTS
- Architecture: Star Schema and Snowflake Schema
- ETL Process: Extract, Transform, Load
- Role of Data Warehousing in Analytics
- Practical Applications of Warehousing in Real-World Projects

SQL

- **CORE SQL CONCEPTS:** SELECT, WHERE, ORDER BY, GROUP BY
- **Joins:** INNER, LEFT, RIGHT, FULL OUTER
- **Aggregations:** COUNT, SUM, AVG, MIN, MAX
- **Subqueries and Nested Queries:** Practical Use Cases
- **CTE (Common Table Expressions):** Recursive and Non-Recursive CTEs
- **Database Design:** Understanding Relationships and Indexing

STATISTICS

- **GENERAL RULES OF STATISTICS:**

Descriptive vs. Inferential Statistics
Measures of Central Tendency and Variability

- **Regression Analysis:**

Linear Regression: Introduction, Assumptions, Applications
Logistic Regression: Binary Classification and Use Cases

- **Hypothesis Testing:**

Null vs. Alternative Hypotheses
p-value Interpretation and T-tests

- **Time-Series Analysis:**

Understanding Trends, Seasonality, and Stationarity
Introduction to ARIMA Models

MACHINE LEARNING

- **SUPERVISED LEARNING ALGORITHMS:**
  - Linear Regression and Polynomial Regression
  - Decision Trees and Random Forests
  - Classification Models: Logistic Regression, k-NN

- **Unsupervised Learning Algorithms:**
  - Clustering: K-Means and Hierarchical
  - Dimensionality Reduction: PCA

- **Random Forest (RF):**
  - Concept, Advantages, and Real-World Applications

DEEP LEARNING AND NLP

- **Artificial Neural Networks (ANN):**
  - Basics of Neural Networks
  - Backpropagation and Optimization
- **Convolutional Neural Networks (CNN):**
  - Image Recognition and Processing
  - Filters, Pooling, and Layers
- **Recurrent Neural Networks (RNN):**
  - Sequential Data Processing
  - LSTMs and GRUs

PYTHON 2

- **SCIKIT-LEARN:**
  - Training and Evaluating Models
  - Hyperparameter Tuning: Grid Search and Random Search
- **TensorFlow:**
  - Basics of Neural Networks
  - Implementation of Feedforward Networks
  - Building and Training Deep Learning Models
- **Flask:**
  - Building Web APIs
  - Deploying Machine Learning Models

Natural Language Processing (NLP)

- **Text Preprocessing:**
  - Tokenization, Stopword Removal, Lemmatization
- **Sentiment Analysis and Text Classification**
- **Word Embeddings:**
  - Word2Vec, GloVe
- **Sequence Models:**
  - RNNs and LSTMs for Text
- **Transformers:**
  - Understanding Transformer Architecture
  - Applications in NLP Tasks (e.g., Translation, Summarization)
  - Introduction to Pretrained Models (e.g., BERT, GPT)

Computer Vision

- **Basics of Image Processing**
- **Applications of CNNs in Vision Tasks**
- **Object Detection and Recognition**

Computer Vision and GenAI

- **Introduction to LLMs**
  - Architecture and Key Components
  - Fine-Tuning LLMs for Specific Tasks
  - Text Generation, Summarization, and Dialogue Systems
- **Introduction to Generative Models**
  - GANs and VAEs
  - Image Synthesis and Text Generation

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