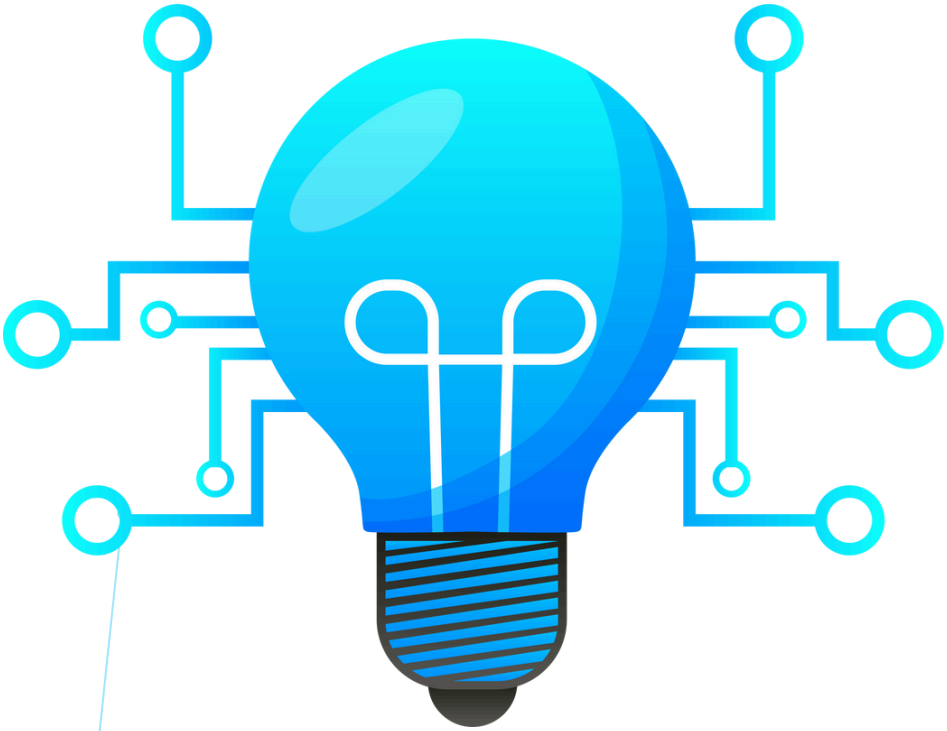
DATA SCIENCE

CURRICULUM

NITYA CLOUDETECH



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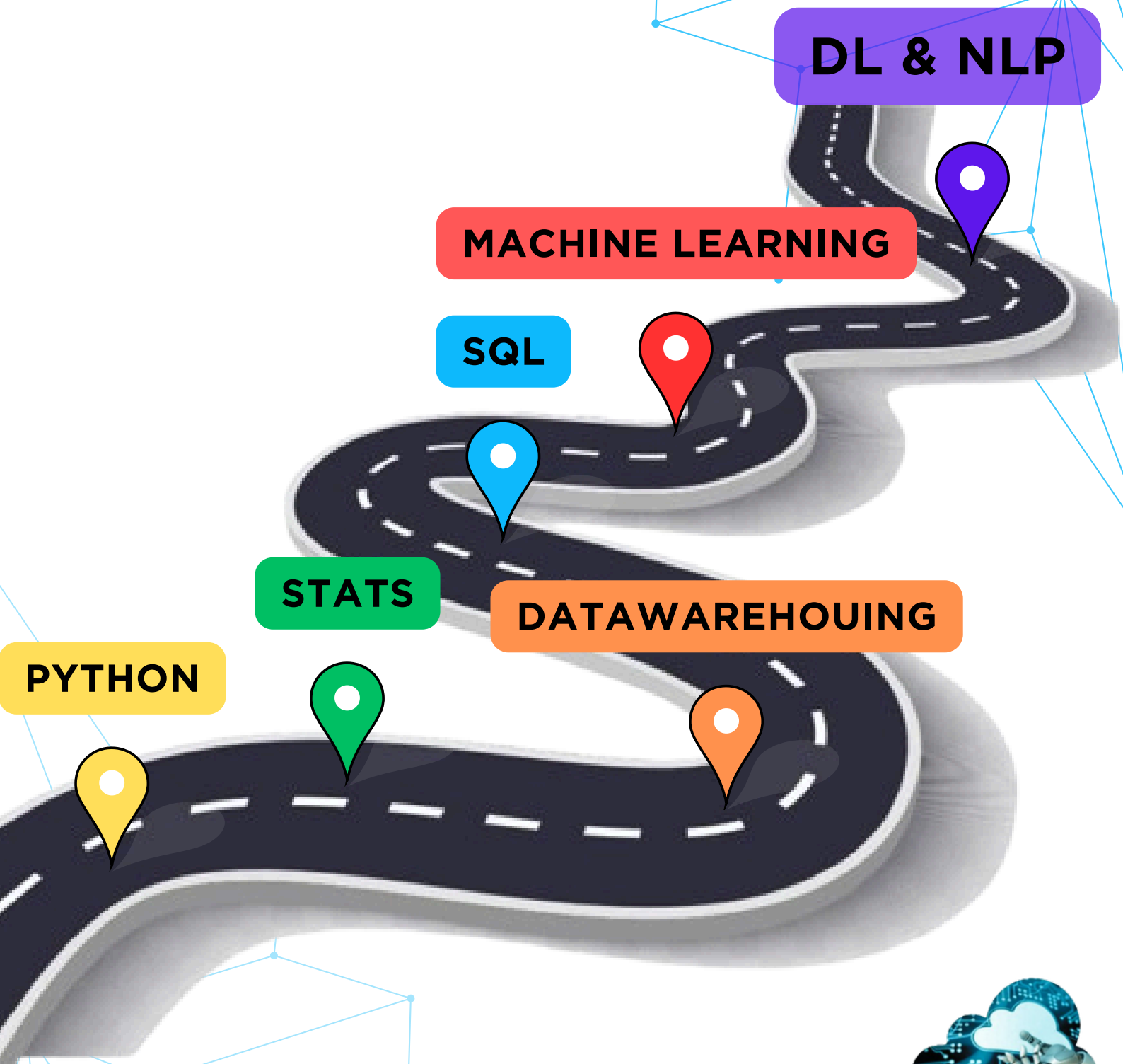
DATA SCIENCE

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

- **DEEP LEARNING BASICS:**

-> NEURAL NETWORKS, ACTIVATION FUNCTIONS
-> CNNS FOR IMAGE PROCESSING
-> RNNS FOR SEQUENTIAL DATA

- **NATURAL LANGUAGE PROCESSING:**

-> TEXT PREPROCESSING (TOKENIZATION, STOPWORD REMOVAL)
-> SENTIMENT ANALYSIS AND TEXT CLASSIFICATION
-> WORD EMBEDDINGS AND SEQUENCE MODELS
-> TRANSFORMERS

1. UNDERSTANDING TRANSFORMER ARCHITECTURE
2. APPLICATIONS IN NLP TASKS (E.G., TRANSLATION, SUMMARIZATION)
3. INTRODUCTION TO PRETRAINED MODELS (E.G., BERT, GPT)

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

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