Full Stack ML/AI Training Track
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LEVEL 1
Pre-requisites
- Fundamentals of any programming language
- Familiarity with basic Algebra, Statistic, Probability and Calculus (Recommended)

Track numbers
- Track 1, 2 and 3

Learning Outcome
After going through these tracks, learners will:
- have built a solid foundation for any ML/AI development. - be familiar with most of the prominent libraries and
frameworks for ML implementations.

Capstone Project
1) Binary Search - Create an application that will try to guess
a numer a user chooses between from a predefined set.
2) Image Resizer - build an application that can resize an image file by changing its dimensions to the target parameters
After going through these tracks, learners will:

Level 2
Pre-requisites
Must have completed L2 or its equivalent

Track numbers
- Track 4 and 5

Learning Outcome

After going through these tracks, learners will:
- gain an in-depth understanding of most of learning models
and their use cases; hyperparameter tuning and ensemble
techniques to optimized the learning models or algorithms. - be able to use the prominent third-party ML services
provided by various cloud vendors and implement real (industry) use cases.

Capstone Project
1) Predict Housing Price – Predict the selling price of a new home in a given region
2) Chatbots – Create a chatbot for customer service.
After going through these tracks, learners will:
– learn specialized AI techniques and applications. – be able to understand and contribute to the R&D
of the specified fields

Level 3

Pre-requisites
Must have completed L1 or its equivalent

Track numbers
– Track 6 and 7

Learning Outcome

After going through these tracks, learners will:
– learn specialized AI techniques and applications. – be able to understand and contribute to the R&D
of the specified fields.

Capstone Project
1) Facial Emotion Recognition and Detection – Use Deep Learning to identify and interpret human facial expressions.
2) Stock Price Predictor – This project seeks to utilize
Deep Learning models, Long-Short Term Memory (LSTM) Neural Network algorithm, to predict stock prices.

Track 1: Math for AI/ML
Statistics
– Types of Data
– Levels of Measurement – Categorical Variables – Numerical Variables
– Histogram
– Cross Tables and

Scatter Plots

- Mean, Median, Mode – Skewness

- Variance

- Standard Deviation – Covariance

- Correlation

Linear Algebra

- What is a Matrix?

- Scalars and Vectors

- Linear Algebra and Geometry

- What is a Tensor?

- Addition and Subtraction of Matrices – Transpose of a Matrix

- Dot Product of Matrices

- Matrix Norms

- Special Matrices and Vectors

Eigenvalues and Eigenvectors – Principle component analysis – Singular value decomposition

Calculus

- Derivatives (Scalar Derivative-Chain rule), Partial and Directional Derivative.

- Integrals

- Gradients

- Differential Operators

- Convex Optimization

- Gradient algorithms– local/global maxima

and minima, SGD, NAG, MAG, Adams

Probability

- Elements of Probability

- Random Variables

- Distributions (binomial, Bernoulli, Poisson, Exponential, Gaussian)

- Variance and Expectation – Bayes' Theorem, MAP, MLE – Special Random Variables - Markov Chain

- Information Theory

Track: 2 Fundamentals of Machine learning

Working with Data

- Exploring your data

- Cleaning and Munging

- Manipulating Data

- Rescaling

- Dimensionality Reduction

Machine Learning concepts

- What is Machine Learning? – Modelling

- Overfitting and Underfitting – The Bias-Variance tradeoff – Data Cleaning

- Data Preprocessing

Supervised Learning
- Simple Linear Regression - Multiple Regression
- Logistic Regression
- Logistic Regression
- Decision Tree
Unsupervised Learning
- Clustering
- K-means clustering
- KNN (k-nearest neighbors)

Track 3: Python for Implementing AI/ML
Python Basics
- Variables and Data Types - Basic python Syntax
- Operators
- Conditional Statements
- Functions - Sequence - Iterations - OOP
- Managing Data using python - Modules and Methods
- Essential Libraries
- Testing Python Code
- Debugging Python Applications
Databases concepts for implementing Machine Learning
Python Frameworks and libraries for ML
- Getting Started with Anaconda
- Installing and understanding the Jupyter's Interface - Prerequisites for Coding in the Jupyter Notebooks
- Numpy
- Scipy
- Scikit-learn
- Theano
- TensorFlow
- Keras
- PyTorch
- Pandas
- Matplotlib

Track 4: Advance Machine Learning
Advance Supervised Learning
- Simple Linear Regression - Multiple Regression
- Logistic Regression
- Logistic Regression
- Decision Tree

- Random Forest
- Naive Bayes
- Neural Networks - NLP
- Network Analysis

Unsupervised Learning
- Clustering
- K-means clustering
- KNN (k-nearest neighbors)
- Hierarchal clustering
- Anomaly detection
- Neural Networks
- Principle Component Analysis
- Independent Component Analysis - Apriori algorithm

Semi-supervised learning
Ensemble methods
- Bagging - Stacking - Boosting

Reinforcement Learning
- State-action-reward-state-action (SARSA) - Q-learning
- Deep Q-Networks

Deep Learning
Computational Learning Theory
Genetics Algorithm
The End-to-End Machine Learning Process (Putting it all together)
- Collection of Data
- Data Wrangling
- Model Selection
- Model Evaluation
- Model Deployment

Track 5: Machine Learning in the Cloud

Cloud Fundamentals
ML using ORACLE Cloud

Track 6: Artificial Intelligence Essentials
Introduction to Artificial Intelligence (AI)
- Elements Of Intelligence
- Intelligent Systems
- Research Areas of AI
- Agents and Environments
- Popular Search Algorithms
- Industry Applications of Artificial Intelligence - Fuzzy Logic Systems
- Expert systems