

AI/ML PRACTICUM

Learning Outcomes

- Understanding on AI and Machine Learning
- Ability to identify the real-life problems that can be solved through Machine Learning
- Ability to perform feature engineering and pre-processing steps
- Understanding of Machine learning algorithms
- Skill to implement and build machine learning models with python and its supporting packages
- Understanding of model evaluation and visualization techniques.
- Ability to apply Machine Learning on Images
- Attain basic Understanding of Deep Learning and its implementation

Module 1: Introduction to Machine Learning

- Introduction to AI
- What is machine learning?
- Installation and update of tools
- Taming Python

Hands on

- Setting up environment for machine learning
- Python programming : basics, strings, controls structures, containers, functions, classes
- Numpy

Module 2: Exploring and using data sets

- Machine learning algorithms
- Collecting data
- Feature Engineering and Model Selection
- Learn the steps to pre-process a dataset and prepare it for machine learning algorithms

Hands on

- Matplotlib, Seaborn -visualization
- Feature engineering and pre-processing –loading datasets, PCA, LDA, Label Encoding, Scaling

Module 3: Supervised vs. unsupervised learning

- Review of machine learning algorithms
- Regression - Linear Regression - Implementation and Evaluation
- Classification – SVM - Implementation and Evaluation
- Clustering – K Means - Implementation and Evaluation

Hands on

- pandas –loading external dataset, data pre-processing
- Implementing – SVM, Linear regression, K-Means
- Evaluating and visualizing results

Module 4: Neural Networks and NLP

- Introduction to Neural Networks
- Perceptron – Implementation
- MLP – Implementation
- Basics of NLP

Hands on

- Implementing perceptron
- Implementing MLP
- Text feature extraction using NLTK and classification

Module 5: Applied Machine Learning and Computer Vision

- Image representation
- Manipulating images with OpenCV and PIL
- Feature extraction from images
- Classification
- Visualization

Hands on

- Data collection
- Image feature extraction using opencv
- Image classification using svm

Module 6: Deep Neural Networks

- Understanding Deep Neural Networks
- Technology Stack – Tensorflow, Keras, Pytorch
- Implementation of DNN as NLP
- CNN for image Classification
- RNNs and LSTM for sequential and time series data.

Hands on

- Experiments with tensorflow
- Implementing DNN
- Image classification using CNN
- Time series data prediction using RNN/LSTM