

CURRICULUM

FOUNDATIONS

Python for AI & ML

- Python Basics
- Python Functions and Packages
- Working with Data Structures, Arrays, Vectors & Data Frames
- Jupyter Notebook – Installation & function
- Pandas, NumPy, Matplotlib, Seaborn

Statistical Learning

- Descriptive Statistics
- Probability & Conditional Probability
- Hypothesis Testing
- Inferential Statistics
- Probability Distributions

MACHINE LEARNING

Supervised learning

- Linear Regression
- Multiple Variable Linear Regression
- Logistic Regression
- Naive Bayes Classifiers
- k-NN Classification
- Support Vector Machines

Unsupervised learning

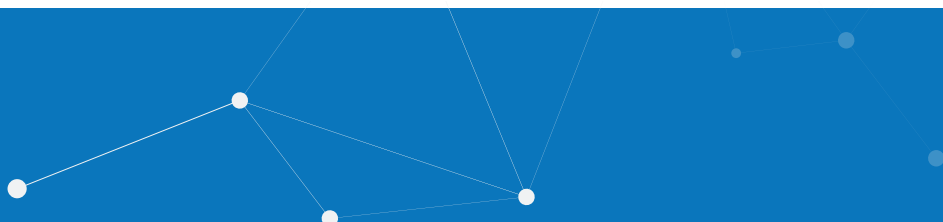
- K-means Clustering
- Hierarchical Clustering
- Dimension Reduction-PCA

Ensemble Techniques

- Decision Trees
- Bagging
- Random Forests
- Boosting

Recommendation Systems

- Introduction to Recommendation Systems
- Popularity based model
- Content based Recommendation System
- Collaborative Filtering (User similarity & Item similarity)
- Hybrid Models



ARTIFICIAL INTELLIGENCE

Introduction to Neural Networks and Deep Learning

- Introduction to Perceptron & Neural Networks
- Activation and Loss functions
- Gradient Descent
- Batch Normalization
- TensorFlow & Keras for Neural Networks
- Hyper Parameter Tuning

Computer vision

- Introduction to Convolutional Neural Networks
- Convolution, Pooling, Padding & its mechanisms
- Forward Propagation & Backpropagation for CNNs
- CNN architectures like AlexNet, VGGNet, InceptionNet & ResNet
- Transfer Learning

NLP Basics(Natural Language Processing)

- Introduction to NLP
- Stop Words
- Tokenization
- Stemming and lemmatization
- Bag of Words Model
- Word Vectorizer
- TF-IDF
- POS Tagging
- Named Entity Recognition

Sequential Models and NLP

- Introduction to Sequential data
- RNNs and its mechanisms
Vanishing & Exploding gradients in RNNs
- LSTMs - Long short-term memory
- GRUs - Gated recurrent unit
- LSTMs Applications
- Time series analysis
- LSTMs with attention mechanism
- Neural Machine Translation

Advanced Computer Vision

- Object Detection
- YOLO, R-CNN, SSD
- Semantic Segmentation
- U-Net
- Face Recognition using Siamese Networks

Introduction to GANs (Generative adversarial networks)

- Introduction to GANs
- Generative Networks
- Adversarial Networks
- How GANs work?
- DCGANs - Deep Convolution GANs
- Applications of GANs

Introduction to Reinforcement Learning (RL)

- RL Framework
- Component of RL Framework
- Examples of RL Systems
- Types of RL Systems
- Q-learning

PROJECTS

Projects as part of our programs fall into the following domains. Students of the Foxangle will work on projects on all areas mentioned, while learners as part of the Foxangle - ML program will work on areas limited to Machine Learning.

MACHINE LEARNING

- Supervised Learning
- Unsupervised Learning
- Ensemble Techniques
- Recommendation Systems

ARTIFICIAL INTELLIGENCE

- Neural Networks
- Computer Vision
- NLP
- Reinforcement Learning
- Recommendation Systems
- GANs(Generative adversarial networks)



LANGUAGES AND TOOLS

Participants of the Foxangle will work & develop expertise on all the tools mentioned below

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AIML TOOLS



Keras



Pytorch



Tensor Flow



NLP library NLTK

ML TOOLS



Pandas



Numpy



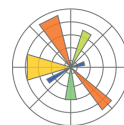
Scipy



Python



Scikit-learn



Matplotlib



Learn more about the program



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