Project Roadmap for Machine Learning

Month 1

Month 1

Total Hours to be spent

34

Week 1	Hours
Variables, Range, Population Distribution, Sample Distribution	1
PDFs, CDFs	1
Central Limit Theorem	1
Variance, Standard Deviation, Expectation	1
Probability Distributions (Gaussian, Standard, Poisson)	1
Maximum Likelyhood Estimation	1.5
Parzen Windows	1
Total Hours	**7.5**

Week2	Hours
What is Learning? Why Machine Learning works? Group meets in batches	1
Linear Regression	1
Logistic Regression	1.5
Session on Numpy+Pandas	1.5
Implement Linear+logistic Reg.	1
kNN	1
Decision Trees	1
Total Hours	**8**

Week3	Hours
Implement kNN+DT	1
Support Vector Machines	2
Naive Bayes	1
Implement SVMs+NBs	1
k-means clustering, k- medoids	1.5
DBSCAN	1.5
Heirarchical Clustering	1.5
Total Hours	**9.5**

Week 4	Hours
Implement k-means clus, k-medoids, DBSCAN, HC	1.5
Batch Meet to discuss the progress, get feedback and cover if anyone is left in something	2
Introduction to RL: Definition and Types	1
Contrast in Supervised, Unsupervised and Reinforcement	1
SARSA	1
Q- Learning	1
Deep Q- Networks	1.5
Total Hours	**9**

Month 1

Month 2

Total Hours to be spent

23

Week 1	Hours
Implement SARSA, Q- L, DQNs	1.5
Practical Applications	1
Challenges and Future Scope	1
Normalization	0.5
Standardization	0.5
Handling Outliers	0.5
Handling Missing Values	0.5
Total Hours	**5.5**

Week2	Hours
Imbalance Data	0.5
Binning	0.5
Encoding	1
Feature Scaling	1
Accuracy	0.5
Logarithmic Loss	0.5
Confusion Matrix	1
Total Hours	**5**

Week3	Hours
F1 Score	1
MSE & MAE	0.5
Cross Validation	0.5
Bias Variance Tradeoff	0.5
Singular Value Decomposition	1
Principal Component Analysis	1
Self Organizing Maps	1
Total Hours	**5.5**

Week 4	Hours
Perceptrons	1
Multilayered Perceptrons	0.5
Feedforward Neural Network	1
Gradient Descent (GD)	1
Backpropagation	1
Types of Optimisation Algos: Stochastic, Nesterov, Mini- batch, ...	1.5
Bootstrap Aggregation	1
Total Hours	**7**

Month 1

Month 3

Total Hours to be spent

36.5

Week 1	Hours
Adaboost	1
LGBM	1
XGBoost	1
CatBoost	1
Batch Meet to discuss the progress, get feedback and cover if anyone is left in something covered so far	2
Bayesian Networks	1
Latent Variables	0.5

Week2	Hours
Gaussian Mixture Model	1
Hidden Markov Model	1.5
Viterbi Algorithm	1
Session on Pytorch/Tensorflow, Keras	1.5
Recurrent Neural Networks	1
LSTM	2
GRU	1

Sub- Topics

- Statistics for Machine Learning
- Supervised Machine Learning (Classic Algorithms)
- Unsupervised Machine Learning (Classic Algorithms)
- Optional Periodic Meetings (Decided by individual batches)
- Reinforcement Learning
- Feature Engineering
- Performance Metrics
- Dimensionality Reduction
- Neural Networks
- Ensemble based Learning
- Probabilistic ML
- ML for Sequential Data

Total Hours	**7.5**

Total Hours	**9**

Week3	Hours
Bidirectional LSTM	2
Word Embedding	1
Transformers	2
Bert	1
Convolution and Convolutional Neural Networks (Intro)	1
Classical CNNs: AlexNet, VGGNet	2
ResNet, Object Classification: Conclusion	2
Total Hours	**11**

Week 4	Hours
Intro to Object Detection and RCNN	1
Fast- RCNN, Faster- RCNN	1.5
YOLO	1.5
Single Shot Detector	1
Image Transformations: 1	1
Image Transformations: 2	1
GAN	2
Total Hours	**9**

Computer Vision: ML for Visual Data