Birla Institute of Technology and Science, Pilani

K. K. Birla Goa Campus

Quark Summer Technical Project

Course Title: Introduction to Machine Learning

Instructors: Ankita Vaishnobi Bisoi, Tejas Agrawal, Soham Chitnis

Scope and Objective of the course: Machine Learning is a field that is developing tremendously today. It becomes all the more important that today's engineers are aware of the nitty-gritty of Machine Learning. This course aims to provide the students with an in-depth knowledge of Machine Learning and a strong foundation in Machine Learning, which can be built upon through personal/professional projects and research. We will begin with the basics of Python and continue with the fundamentals of Machine Learning.

S. No.	Week	Topic	Subtopics
1	Week 1	What is ML, DL, and AI? Intro to Python	**Python**: Lists, Tuples, Dictionaries, Conditionals, Loops, Iterators, Functions, Comprehensions Using Jupyter Notebooks, Google Colab, and GitHub.

2	Week 2	Linear and Logistic Regression Exploratory Data Analysis (how to clean data, find correlations in data) Feature engineering (Handling missing values, bad data).	• Pandas • Matplotlib • Box plots, correlation plots • Introduction to scikit-learn
3	Week 3	KNN, SVM, Naive Bayes Classifier (Covering all theory, math, and statistics behind it)	• Bias-Variance Trade-off, • Validation techniques Metric selection • Loss selection and Info theory
4	Week 4	Decision tree, GBM, and Random forests. (Covering all Math and statistics behind it)	• Bagging and Boosting algorithms
5-6	Week 5-6	Introduction to Neural Networks and Deep Learning	• Backpropagation • Activation functions • Final Assignment

Evaluations

Component	Weightage	Tentative Date	Remarks
Assignment 1	10%	End of Week 1	Assignment on Python

Assignment 2	10%	End of Week 2	Assignment on Regression/ Classification Task
Assignment 3	10%	End of Week 3	Assignment on KNN/SVM/Naive Bayes Classifier
Assignment 4	10%	End of Week 4	Assignment on Decision Tree/ Random Forests
Final Assignment	60%	End of Week 6	Final Project

Contact Details

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Note: Reading material will be provided on Google Classroom every week. Feel free to ask doubts about the group or message the instructors anytime. Suggestions and queries are encouraged.