

Introduction to ML with Python

Anchor and Instructors Details:

A. Anchor Faculty:



Dr Srimanta Mandal received his PhD from IIT Mandi, India in 2017. He has been a postdoctoral fellow with the Department of Electrical Engineering, IIT Madras, India, from 2017 to 2018. Since October 2018, he has been with DAICT, Gandhinagar, where he is currently an associate professor. During his PhD, he received a travel grant from IIT Mandi, for presenting work at International Conference on Image Processing 2014, Paris, France. So far, he has supervised 20 master's students in their dissertation/project work, and co-supervised 1 PhD student. He has published several articles in national/international journals and conferences. He has received the best paper award (runner-up) in the Indian Conference on Computer Vision, Graphics and Image Processing 2018. He served as a reviewer for various conferences and journals. He served as an executive committee member of the IEEE SPS Gujarat chapter from 2019 to 2022. He is a life member of IUPRAI and ISRS. His research interests include image processing, computer vision, and machine learning. [For More Details Click Here](#)

B. Instructors:



Dr Bakul Gohel is an assistant professor at Dhirubhai Ambani Institute of Information and Communication Technology (DA-IICT), Gandhinagar, since 2018. He completed his Ph.D. in the field of bio and brain engineering at Korea Advanced Institute of Technology and Science (KAIST), South Korea, in 2015. He received his master (M.Tech.) degree in the field of information technology (Spec. Bio- Informatics) from IIIT-Allahabad and his MBBS (Bachelor of Medicine and Bachelor of Surgery) degree from a government medical college, Surat, India. Before joining DA-IICT, he was a researcher At the Korea Research Institute of Science and Standards, South Korea, from 2015. His current research interest lies in the field of biomedical signal processing and analysis, brain-computer interaction/interface, cognitive computing and data analysis with the machine learning approach.

[For More Details Click Here](#)



Dr Shruti Bhilare is an Assistant Professor at Dhirubhai Ambani Institute of Information and Communication Technology, Gandhinagar, Gujarat since July 2019. She received her PhD degree in Computer Science and Engineering from the Indian Institute of Technology Indore (IIT Indore), India. Her research interests include pattern recognition and image processing with a focus on biometric applications. She has published several papers in reputed international conferences and journals. [For More Details Click Here](#)



Dr. Rahul Mishra, is currently an Assistant Professor at DA- IICT, Gandhinagar, Gujarat, India. He has previously worked as a Research Associate in the Department of Computational and Data Sciences in Bangalore, India. He completed his PhD in Computer Science and Engineering from the Indian Institute of Technology (BHU) Varanasi, India in 2022 and holds an M.Tech. and B.Tech. degree from Madan Mohan Malaviya University of Technology, Gorakhpur and Dr. A.P.J. Abdul Kalam Technical University, Lucknow respectively, which he earned in 2017 and 2015. He has experience in working with sensors and microcontroller units and their applications in AI, having assisted the tinkering lab for three years at IIT (BHU). Dr Mishra is a reviewer for several well-known journals, including IEEE TMC, IEEE IoT, IEEE Sensors, IEEE TNSM, IEEE ITS, and IEEE TII. He is serving as Guest Editor for a special issue on Federated Learning in MDPI. He has also received a Student Travel Grant from the ComSoc Society for the IEEE INFOCOM in 2021 and 2022. His research interests are focused on Fog Computing, IoT, Smart Sensing, Machine Learning, and HCI.

[For More Details Click Here](#)



Ankush Chander is an AI consultant with a focus on Natural Language Processing and Information Retrieval. He completed his master's degree from DA-IICT, Gandhinagar, Gujarat, India in 2016. Post that he co-founded RAX (now Enago Read) where he also worked as a Research Engineer from 2016 to 2023. Previously he has worked as a Web Developer in MotherSumi Infotech & Design Ltd. He is also an Open source enthusiast and has contributed to projects like Pytextrank, Argilla, and kglab.

[For More Details Click Here](#)

TENTATIVE COURSE OUTLINE:

Sr. No.	Module	Session	Content	Hours	Instructor/TA
1	Mathematical Preliminaries	Theory	Review of probability theory, random variables, matrix computations, optimization	4	S. Mandal
2		Lab	Review of Python programming, Illustration of matrix diagonalization, SVD, Gradient descent, Steepest descent	3	A.Chander R. Mishra and TAs
3	Intro to Digital Image Processing	Theory	Basics of Digital Image, Intensity Transformation, Spatial Filtering, Image Restoration, Image Segmentation	4	S. Mandal
4		Lab	Based on the theory	3	A.Chander R. Mishra, S. Mandal and TAs
5	Supervised Learning	Theory	Introduction to machine learning, supervised machine learning techniques: linear regression, logistic and softmax regression, decision tree and random forest, SVM and kernel methods.	6	S. Bhilare
6		Lab	Linear and polynomial regression, Logistic regression, Decision tree, SVM for linear and non-linear decision boundary	4	A.Chander R. Mishra, S. Bhilare and TAs
7	Unsupervised Learning	Theory	Overview of clustering, K-means, DBSCAN, PCA, ICA, and GMM	2	R. Mishra
8		Lab	K-means, DBSCAN, PCA, ICA, GMM	2	R. Mishra and TAs
9	Deep Neural Networks	Theory	ANN, CNN, Different Architectures, Transfer learning, Model capacity and regularization, SGD and ADAM optimization	4	B. Gohel
10		Lab	Data pre-processing and Normalization, Classification and Regression using ANN, Image classification and segmentation using CNN, Model training and tuning, and Performance Evaluation	4	B. Gohel and TAs
11	Adversarial ML	Theory	Adversarial Attacks: Introduction to adversarial machine learning, why adversarial machine learning overview of different types of adversarial attacks such as white-box and black-box; untargeted and targeted	2	S. Bhilare
12		Lab	Based on the theory	2	S Bhilare and TAs