Machine learning with Python for Practical Applications

Greater Noida Extension Centre, IIT Roorkee

Residential Training of NIC officers from 24th – 28th June 2019

An Extensive Training of a batch of NIC officers was conducted with help of Training Division, NIC & IIT Roorkee coordinators. For this we thank our DG, Dr. Neeta Verma, Sh. Rajesh Pathak, HOD Training Division & IIT Roorkee Professors Dr. Sanjeev Kumar & Prof. Jaydev and team of IIT Researchers for their hospitality and due diligence in covering both the theoretical & practical aspects of Machine Learning (ML) & Deep Learning (DL).

We also thank all participants for their interest, extending stay sixth day for getting familiarization with DGX servers in COE-AI lab and making it possible to attend at short notice in spite of inconvenience caused in reservations, with summers on and getting late night flights. We thank our DDG, Sh. G.K.Gaur for addressing all the participants on VC from NIC SDU, Pune on Saturday.

Presentation of Memento to Sh. R K Pathak by Dr. Sanjeev Kumar, IIT Roorkee

Topics Covered Daywise were as follows :

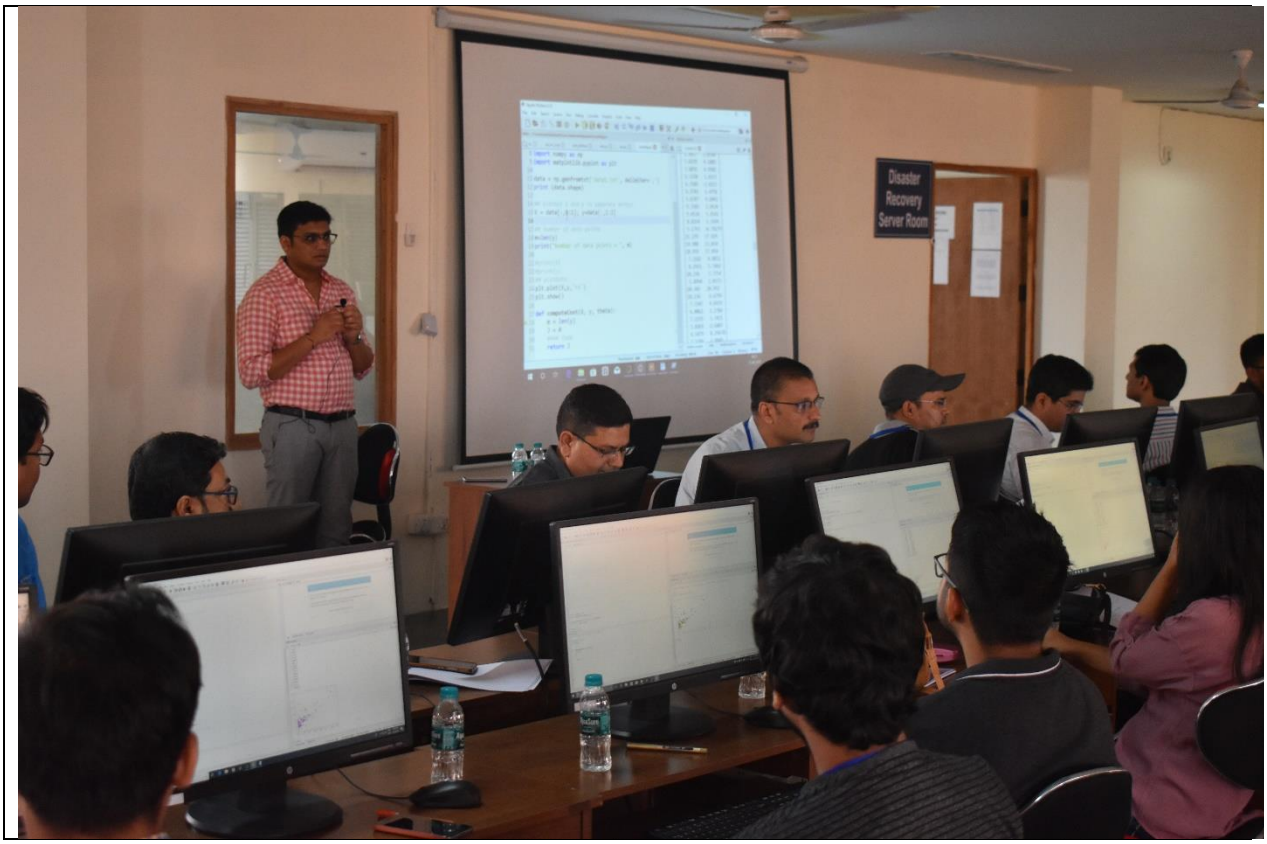
Day I

1. Introduction to Machine Learning by Dr. Sanjeev Kumar, IIT Roorkee (SK)
2. Dimensionality Reduction in ML using PCA & LDA (SK)
3. Introduction to Python & working with files Lab session - 1 (SK)
4. Working with Numpy and Matplotlib Lab Session -2 (SK)

1st day Lecture Session underway

Day 2

1. Linear Regression (LR) by Sh. Arpit Singhal, Industry Expert (AS)
2. LR with Python Lab session -1
3. Logistic Regression & Polynomial Regression (AS)
4. Lab Session -2 on Logistic & Polynomial Regression (AS & SK)

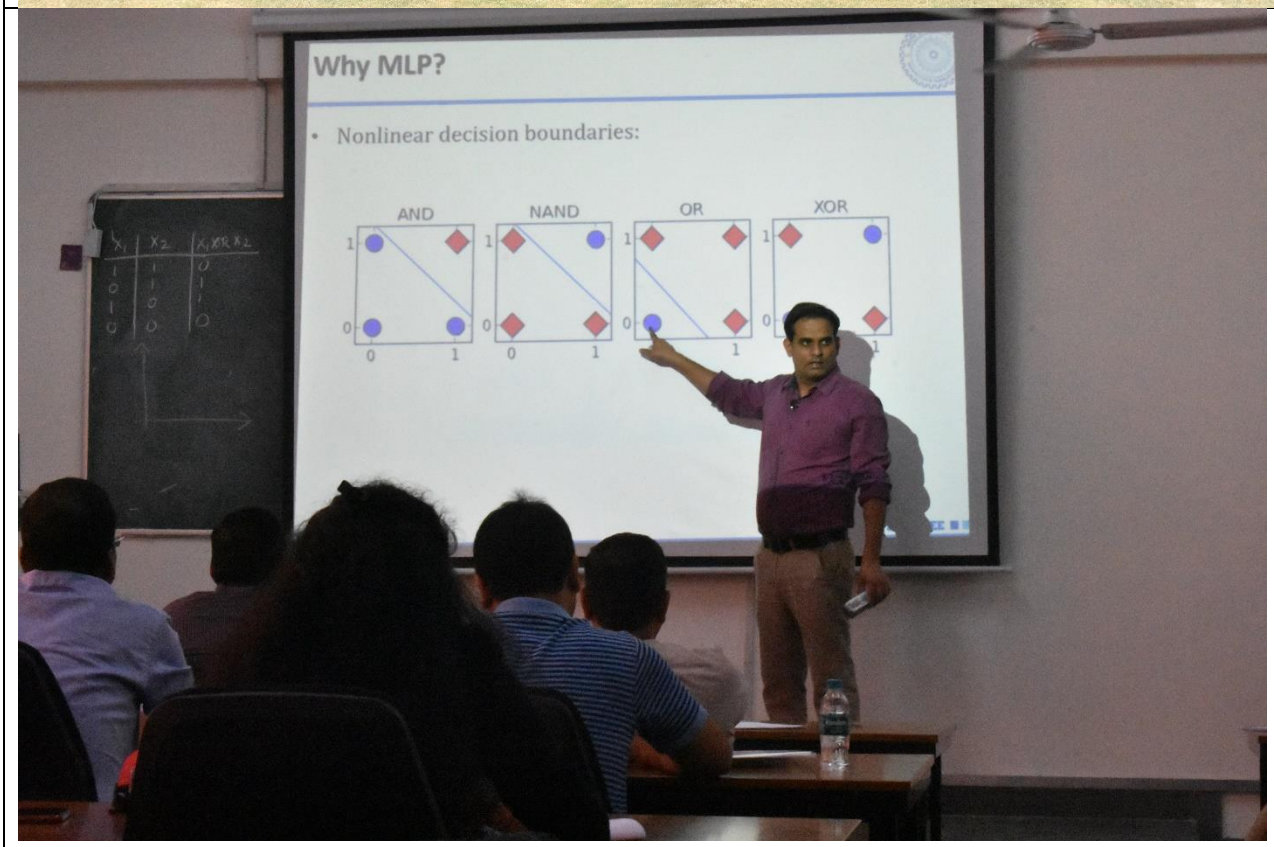


2nd Day Lab session underway

Day 3

1. Linear Programming problem, Quadratic Programming problem & Soft margin Classifier by Prof. S.K Gupta, IIT Roorkee (SG)
2. Non Linear Classifier, Proximal Support Vector machines & Twin Support Vector Machines (SG)
3. Support Vector machine Implementation of SVM in Python Lab Session – 1 (SG)
4. Perceptrons & Artificial Neural Networks, Multilayer Perceptrons, Sigmoid, tanh, Relu activation functions (SK)
5. Implementing Neural Networks in Python LabSession -2 (SK)


CONTINUING EDUCATION CENTRE
INDIAN INSTITUTE OF TECHNOLOGY
ROORKEE
SHORT TERM TRAINING PROGRAM
ON
MACHINE LEARNING WITH
PYTHON FOR PRACTICAL
EXAMPLES


Why MLP?
• Nonlinear decision boundaries:
AND
NAND
OR
XOR

Day 4

1. Introduction to Deep Learning & Convolutional Neural Networks by Dr. Subramanian Murala, IIT Ropar (SM)
2. DIGIT classification, AlexNet, InceptionNet, ImageNet, VGG16, ResNet50, 101 & 152 & MobileNet (SM)
3. Implementation of DL in Python & its Libraries, Tensorflow, Histogram equalized Image using Google Colab in Lab session -1 (SM)
4. Auto encoders, Image Segmentation & Unet, Image to Image Translation, and GANs for Computer Vision (SM)
5. Lab Session -2 on Autoencoders & GANs (SM)

Day 5

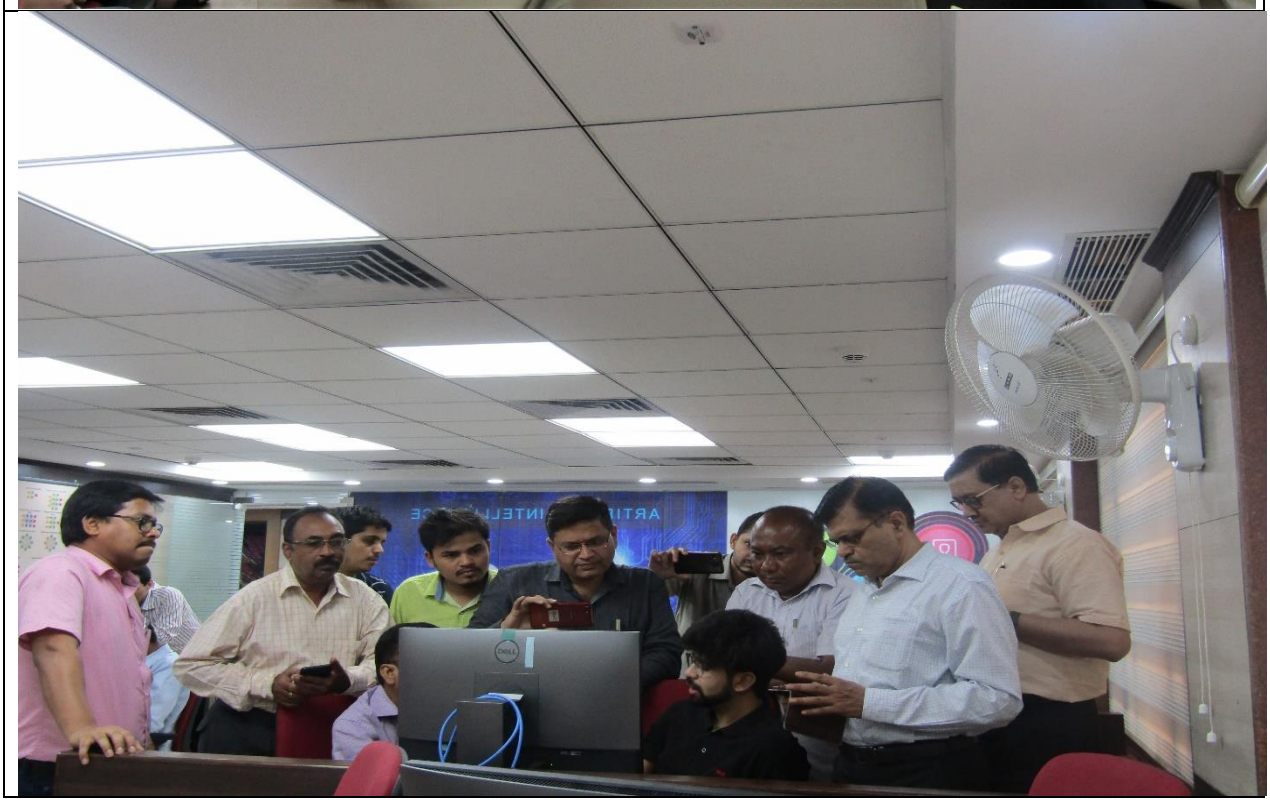
1. Practical applications with Deep Learning, Pattern recognition & Segmentation by Dr. Partha Pratim Roy, IIT Roorkee (PR)
2. Document Image processing, MobileOCR (Translation of scripts), Offline & Online OCR, SceneText Analysis (PR)
3. Gesture Recognition, Video surveillance & Trajectory analysis, Brain Computer Interface (using electroencephalograms) (PR)
4. Practical example using Electroencephalogram readings Lab session -1 (IIT Researcher)
5. Valedictory session

Hostel in Background with AC Rooms

Good Training academy & lab, excellent hostel facilities, knowledgeable professors & excellent teaching skills. We plan to send the next batch of officers from states that could not be accommodated in this batch. Only requirement of officers is to complete the Python beginners & AI & ML beginner's courses in http://vidyakosh.nic.in before being selected for the training course, so that you can appreciate what is being taught.

Day 6 – COEAI Lab 29th June 2019

1. Introduction to http://ai.nic.in
2. Introduction to AI Development Platform as a Service
3. Introduction to DGX Server Architecture & Software Stack
4. Introduction to Docker containers & Kubernetes orchestration
5. Address by DDG & HOG (AIRD) Sh. G.K. Gaur through VC
6. Lab Session – Introduction to Annotation tool for Object Detection, How to Train a model & Test validation accuracy



List of Trainees

1. Daphne K War – Meghalaya
2. Hazel Nicolette Manners – Meghalaya
3. Nidhi Lohat – Chatbot division, Delhi
4. C Ambily Raju - Karnataka
5. Vijay C Navalgund – Karnataka
6. Any Gupta – AI Resource Division, Delhi
7. Dilip Kumar Mandhata – Odisha
8. Sanjay Rajaram Vaidya – Maharashtra
9. Sangeeta Biswas – PFMS division, Delhi
10. Dr. N. Raveendran – Puducherry
11. Rakesh Sharma - Uttarakhand
12. Rohit Kumar - AI Resource Division, Delhi
13. Sabarinathan S A - Gujarat
14. Prabhat Bisht – Haryana
15. Ajay Kumar - AI Resource Division, Delhi
16. A K Bhatnagar – MP
17. Mukul Saxena – UP
18. Anil Chaubey - AI Resource Division, Delhi
19. Dr. Subrato Roy Gupta – West Bengal
20. Suman Mahajan – West Bengal
21. Dhrubajyoti Gupta, GIS Division, Delhi
22. Mihir Ranjan Mohanty – Jharkhand
23. Neeraj Tiwary – DGRC, Patna
24. Mrityunjaya Singh – MOHUA, Delhi
25. Pirthi Pal Singh – Punjab
26. K Gopalkrishna Sharma - Manipur
27. P J Leo Evanss – MDWS, Delhi
28. Saswat Swaroop – NPP Delhi
29. Rajeev Kumar Yadav – Application Security, Delhi
30. Sharmistha Dasgupta - AI Resource Division, Delhi