

Brochure



South Indian Education Society's
GRADUATE SCHOOL OF TECHNOLOGY, Navi Mumbai.
DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION
ENGINEERING

Machine Learning and Image Processing using Python

June 21 to July 9, 2021

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There is difference between education and knowledge. Education provides learning. While knowledge translates that learning into a career that earns a living. But the truth is, our education system is largely structured around academic learning, leaving the task of turning it into a career to the individual. For the less-privileged though, the only barrier that stands between them and a technocrat is knowledge of practical aspects of technology.

This course is meant to be a hands-on type course, giving students a chance to learn python and its applications in image processing and Machine learning which is considered to be a current trend of technology.

About Instructors:

This course will be taught by a team of software design researchers, Mr. Abhay Phansikar, Director, Agilen Technologies, Mr. Prasanna Biswas, Machine learning Engineer at Corporate R & D Qualcomm and Prof. Swati Rane, Prof. Pushkar Sathe, Prof. Shyamala Mathi, SIES GST.

Course Objectives:

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To write and explain basics commands of python
To explain basics of image processing
To implement basic image processing using python
To explain concepts of machine learning
To write codes of machine learning using python
To implement mini project based on image processing and machine learning using python

Course Outcomes:

- To use Python – Jupyter tool
- Perform all basic operations in the Dataset and Visualize data using the libraries
- Perform basic operations on digital image using Python
- Implement classifier model for given data and compare its performance with other classifier.

Course Content:

Module	Contents	Hours
1.	Basics of python Overview of python, python data types, built in data structure, Lists, tuples, dictionaries, string built in methods.	8 hrs
2.	Applications in image processing Histogram of image, splitting color image into RGB, Histogram Equalization, edge detection using simple operators.	8 hrs
3.	Applications in Machine learning Introduction to machine learning, data manipulation and pre-processing, data visualization, linear and logistic regression, SVM, decision tree, classification using KNN, Implementation of CNN.	24 hrs

Assessment:

1. Students will be assessed based on module wise assignments and quizzes.
2. Students have to develop Mini projects based on above concepts.

Course Co-ordinator: Prof. Pushkar Sathe

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Contact no.: 9870630637

Day wise schedule of workshop

Day	Activity
Day 1 21/6/2021	Introduction to Python, datatypes, Numpy Exercise on Python, datatypes, Numpy
Day 2 22/6/2021	Python for Data Science – Pandas: Introduction to Pandas, Series, Dataframes – Missing Data, Groupby, merging, operations and Data i/p and o/p. Python for Data Visualization using Matplotlib and seaborn Exercise on Pandas, Matplotlib and Seaborn
Day 3 23/6/2021	Introduction to digital image processing, image enhancement techniques Exercise on Digital Image enhancement techniques
Day 4 24/6/2021	Image segmentation, morphological processing Exercise on Image segmentation, morphological processing
Day 5 25/6/2021	Basics of machine learning, simple linear regression Exercise on simple linear regression
Day 6 28/6/2021	Multiple Linear Regression and Logistic Regression Exercises on Multiple Linear Regression and Logistic Regression
Day 7 29/6/2021	Decision tree algorithm, support vector machine Exercise on Decision tree algorithm, support vector machine
Day 8 30/6/2021	K-means and KNN algorithms Exercise on K-means algorithm
Day 9 01/7/2021	Basics of neural network, types of neural network Quiz on Machine Learning
Day 10 02/7/2021	Expert talk on “Applications of ML in industry”, Mr. Abhay Phansikar, Director, Agilen Technologies Quizzes on Basics of Python and Image Processing
Day 11 03/7/2021	Expert talk on “Session on computer vision and NLP”, Mr. Prasanna Biswas, Machine learning Engineer at Corporate R & D Qualcomm Instruction on Mini Project, Feedback Form

from 04/7/2021
to 09/7/2021

Implementation of MiniProject and presentation



SIES Graduate School of Technology
Sri Chandrasekarendra Saraswati Vidyapuram
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Department of Electronics and Telecommunication Engineering
Event Report

Internship on Machine Learning & Image Processing using Python (21/6/2021 to 09/7/2021)

Event Information

Event Type:SDP

Event title: Machine Learning & Image Processing using Python

Resource Person: Pushkar Sathe, Swati Rane and Shyamala Mathi

Event date:from 21/06/2021 to 09/07/2021

Organized for: Students

Organized by:Department of Electronics and Telecommunication

Target audience (branch & nos.): EXTC(48), ME(01), CE (08), IT(01) – 58 students

Attachments: 1. Photographs (in JPEG/PNG)

2. Attendance report

3. Feedback

4. Certificate

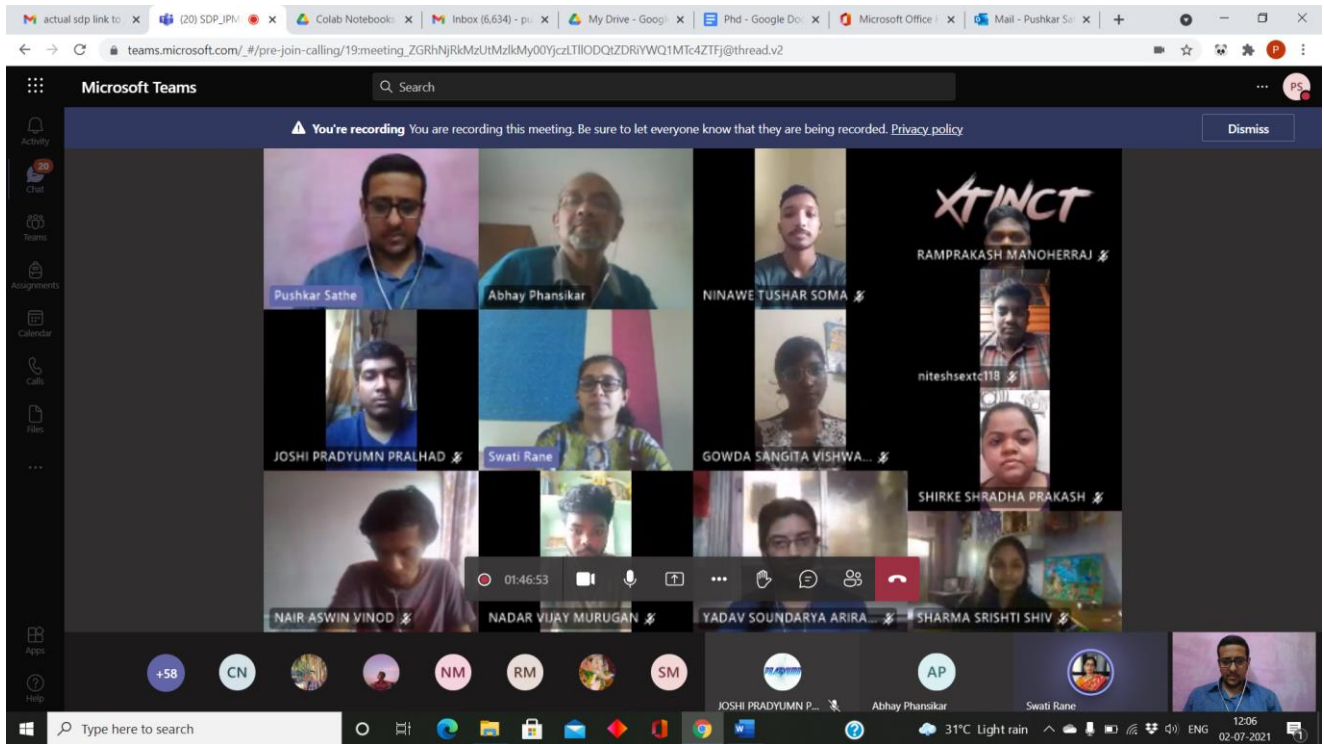
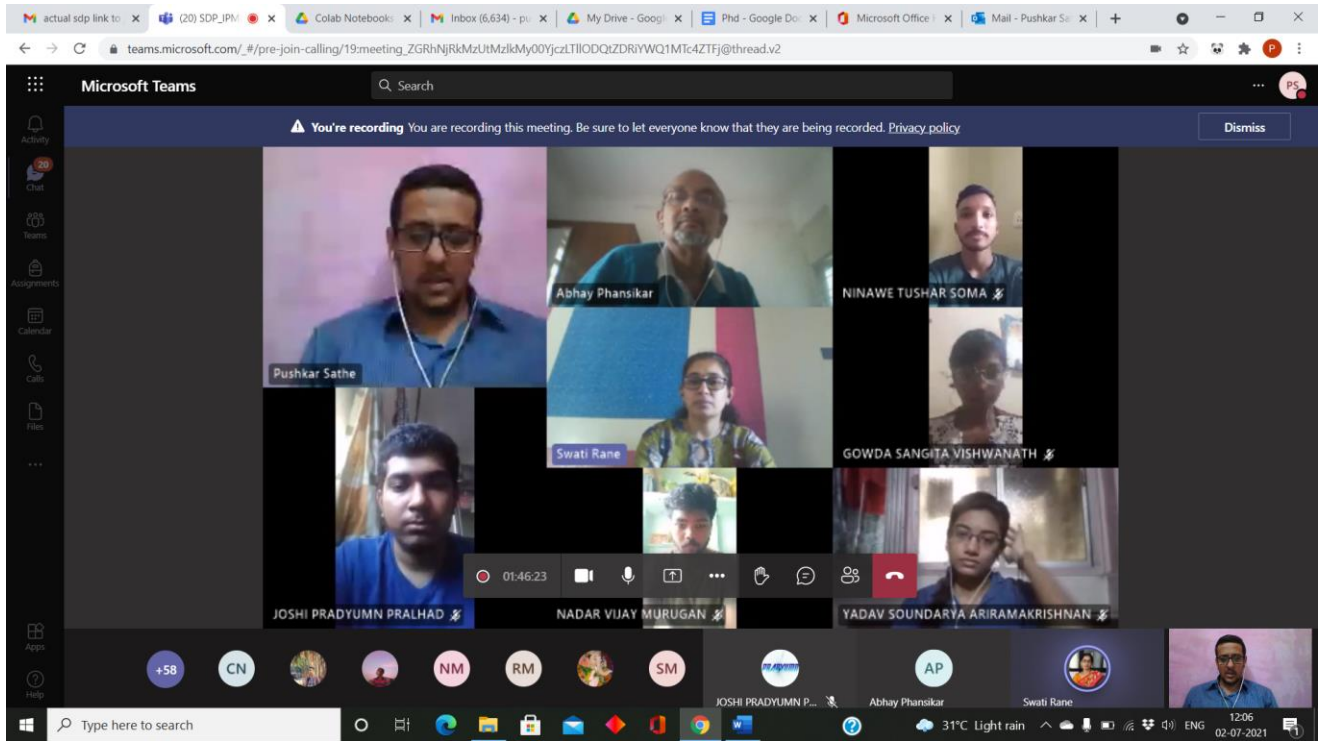
Event Description

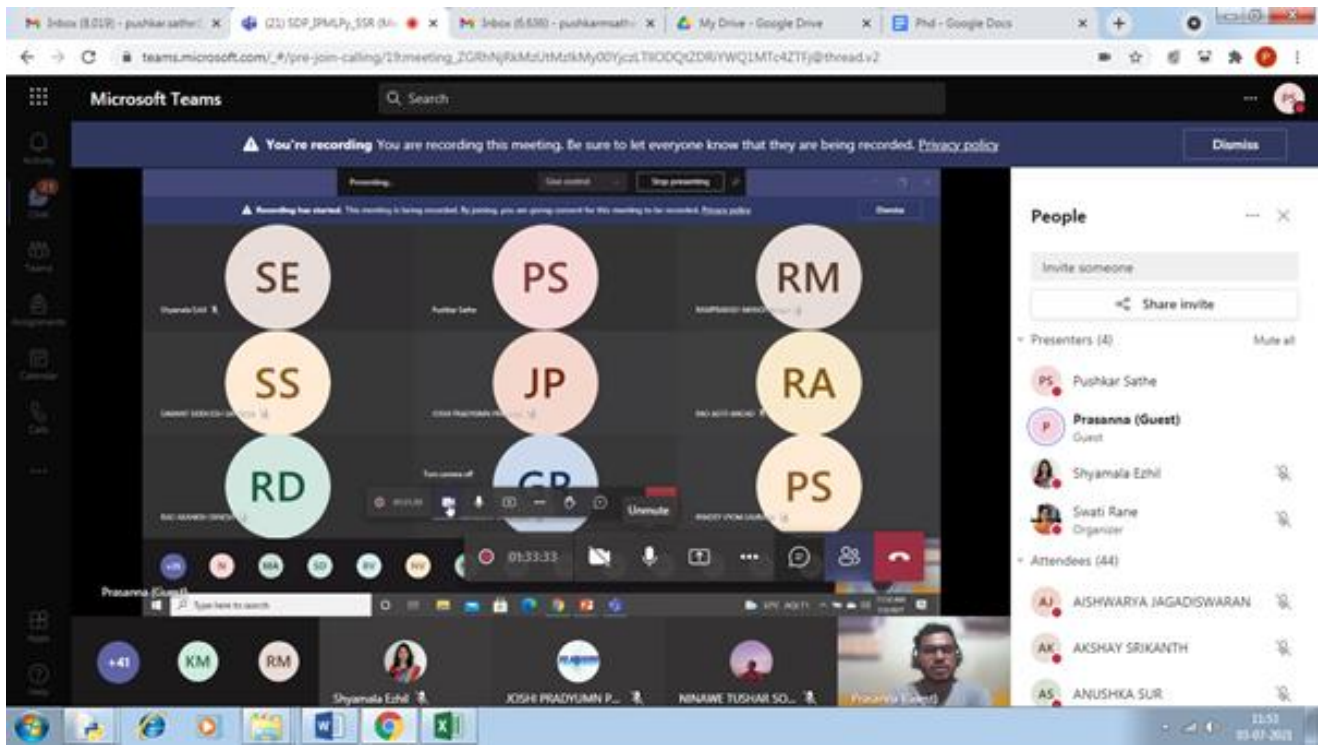
This course provides the broad introduction to the fundamentals of the Python programming language, Image Processing and Machine Learning, along with programming best practices. It includes how to represent and store data using Python data types and variables, the power of complex data structures like lists, sets, dictionaries, and tuples to store collections of related data, write scripts & handle errors and how to use modules such as Numpy, Pandas, Matplotlib and Seaborn available in the Python Standard Library.

The field of image processing involves the use of computer algorithms to process images for analysis. Thus it also includes how to implement various Image enhancement and Image segmentation techniques using Open CV.

Computer vision has transformed the way we pursue digital image processing. Hence, Machine Learning is included in the course. The most effective machine learning techniques (Linear and Logistic Regression, SVM, Decision Tree, Random forest, KNN and K-means algorithms), Deep Learning (CNN) are included and students will gain practice by implementing them using scikit-learn, tensorflow, and keras python modules.

1. Photographs (in JPEG/PNG)





3. Feedback (Analysis)

Students feedback on the SDP about contents, understanding of concepts, content delivery, given project was taken and analysed. All students gave feedback in the range of good to excellent.

Few sample comments about the SDP by the students:

1. Content was good.
2. Highly informative
3. Sessions were great.
4. Excellently topic covered in short span of time
5. The content was systematic and useful, solving proper assignment helps a lot.

Also students gave suggestions like

1. The industry experts should also conduct hands-on sessions instead of theoretical type session.
2. Needed to learn more basics of ML
3. Programming language basics could have been covered a little in depth. Introduction to libraries and functions could have been done in lesser time since we can read the document and forums related to it and most the function are similar in working and syntax. Hands on training by industry professionals would be much appreciated during the duration of SDP.

Impact Analysis:

In 3 weeks SDP cum Internship on 'Machine Learning and Image Processing using Python' basics of Python, Image processing using Open CV along with machine learning algorithms were learnt by students through sessions, assignments, exercises. All the students successfully completed projects and gave presentations.

Module wise quiz was conducted. Quantitative analysis for the same is as given below.

Sr.No.	Module Name	% of students Scoring 60% and above marks
MODULE-1	Basics of Python	92.5%
MODULE-2	Image Processing using OpenCV	85.2%
MODULE-3	Machine learning algorithms	88.9%

4. Certificate

