

Full Stack Data Science Feb'21 Tech Neuron

Instructors:

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Sunny Savita: I'm an AI enthusiast, graduate in Computer science and engineering. Currently working with

Curriculum:

Welcome to the Course

- Course Overview
- Dashboard Introduction

Python Fundamentals

- Python Basic
- String, List, Indexing
- Tuple, Set & Dict
- If, Else & For Loop
- For Loops & While loops
- Python Program Discussion in loops
- Function Part - 1
- Function Part - 2

Advanced Python

- Iterator Generator & File System
- Exception handling Class 1 part 1
- Exception handling Class 1 part 2
- Exception handling Class 2
- Module & Packages

- OOPS Part 1
- OOPS Part 2
- OOPs Concepts - Polymorphism

Working with Databases & Python

- SQL Part 1
- SQL Part 2
- OOPS Discussion
- Introduction to MongoDB
- Working with Python & MongoDB Part1
- Working with Python & MongoDB Part2
- SQL lite, map, reduce, filter, zip

Working with Pandas & Numpy

- Introduction to Pandas
- Working with Pandas
- Pandas Data Analysis Part 1
- Pandas Data Analysis Part 2
- Pandas and Numpy
- Numpy methods

GUI Programming

- GUI Programming with Tkinter

Working with Graphs & Charts

- Introduction to Graphs & Charts
- Working with Graphs in Python

API

- API Testing

Python Projects

- Flask End-to-End Project
- Review Scraper
- Image Scraper and deployment on Heroku, AWS, and Azure

Statistics

- Introduction to Stats - Day 1
- Stats - Day 2
- Extra doubt session
- Stats - Day 3
- Stats - Day 4
- Stats - Day 5

EDA & Feature Engineering

- Introduction to EDA
- Doubt Clearing session
- EDA and Feature Engineering

Machine Learning

- Linear Regression
- Ridge Lasso Regression, Elastic & Logistic Regression
- Naive Bayes Algorithm and practical implementation of Ridge Lasso and Logistic Regression
- Logistic Practical, SVM, SVR
- Decision Tree Classification
- Random Forest & SVM
- Adaboost
- Gradient Boosting
- Clustering
- Introduction to Machine learning
- Linear Regression

- Linear Regression live coding demonstration part-1
- Linear Regression live coding demonstration part-2
- Project Admission Prediction, Lasso, Ridge & Elastic Net
- Project deployment in Heroku, Azure & AWS
- Logistic Regression
- Logistic Regression implementation
- Decision Tree
- Decision Tree Part 2, Ensemble Tech, Random Forest & Boosting
- KNN and SVM
- Decision Tree Practical Implementation
- Decision Tree Live Coding & Grid Search
- Grid Search, Bagging Classifier & Random Forest
- KNN, SVC, SVR & Stacking
- Clustering
- Clustering and PCA
- PCA practical, DBSCAN and Naive Bayes
- XG Boost, NLTK & TF-IDF

Machine Learning End to End Project

- Machine learning project
- Machine learning project
- ML End to End project Pipeline Explanation
- ML Project Explanation along with GitHub and Docker
- Machine Learning Pipelines Live Coding Part-1
- Machine Learning Pipelines Live Coding Part-2
- 2nd July Live Class
- Machine Learning Pipelines Live Coding Part-2

- Revision Class
- Model training, evaluation and push
- Model training, evaluation and push
- Revision

PCA in ML

- PCA
- PCA Implementation

NLP for Machine Learning

- NLP in ML
- Spam Classification

Time Series Analysis

- Introduction to Time Series
- Time Series Implementation

Stats

- Introduction
- Different types of Statistics
- Population vs Sample
- Mean, Median and Mode
- Variance, Standard Deviation
- Sample Variance why $n-1$
- Standard Deviation
- Variables
- Random Variables
- Percentiles & quartiles
- 5 number summary
- Histograms

- Gaussian - Normal distribution
- Standard Normal distribution
- Application Of Zscore
- Basics Of Probability
- Addition Rule In Probability
- Multiplication rule in probability
- Permutation
- Combination
- Log Normal Distribution
- Central Limit theorem
- Statistics - Left Skewed And Right Skewed Distribution And Relation With Mean, Median And Mode
- Covariance
- Pearson And Spearman Rank Correlation
- What is P-Value?
- What is Confidence Interval?
- How To Perform Hypothesis Testing - Confidence Interval Z Test Statistics Derive Conclusion
- Hypothesis testing part 1
- Hypothesis testing part 2
- Finalizing statistics

ML Projects

- Detailed Project Report explanation
- Project:- Wafer Fault Detection Part 1
- Project:- Wafer Fault Detection Part 2
- Deployment in Heroku using docker and CircleCI

ML Project 1 :- Fault detection in wafers based on sensor data

- Introduction

- The problem statement and Data Description
- The Application Flow
- Ingestion and Validation Part1
- Validation Part2
- DB Operations
- Data Preprocessing
- Clustering
- Model Selection and Tuning
- Prediction
- Deployment

ML Project 2 :- Cement Strength Prediction

- Introduction
- The Problem Statement and Data Description
- The Application Flow
- Code Intro and Logging
- Validation and Transformation
- DB Operations
- Data Preprocessing
- Clustering
- Model Selection and Tuning
- Prediction
- Deployment

ML Project 3 :- Credit Card Defaulters

- Introduction
- The Problem Statement and Data Description
- The Application Flow

- Code intro and Logging
- Validation and Transformation
- DB Operations
- Data Preprocessing
- Deployment

ML Project 4 :- Forest Cover

- Introduction
- The Problem Statement and Data Description
- Application Flow
- Code intro and Logging
- Validation and Transformation
- DB Operations
- Data Preprocessing
- Clustering
- Model Selection and Tuning
- Prediction
- Deployment

ML Project 5 :- Income Prediction

- Introduction
- The Problem Statement and Data Description
- The Application Flow
- Code intro and Logging
- Validation and Transformation
- DB Operations
- Data Preprocessing
- Clustering

- Model Selection and Tuning
- Prediction
- Deployment

ML Project 6 :- Insurance Fraud Detection

- Introduction
- The Problem Statement and Data Description
- The Application Flow
- Code Intro and Logging
- Validation and Transformation
- DB Operations
- Data Preprocessing
- Clustering
- Model Selection and Tuning
- Prediction
- Deployment
- The Problem Statement and Data Description

ML Project 7 :- Mushroom Classification

- Introduction
- The Application Flow
- Code Intro and Logging
- Validation and Transformation
- DB Operations
- Data Preprocessing
- Clustering
- Model Selection and Tuning
- Predictions

- Deployment

ML Project 8 :- Phishing Classifier

- Introduction
- The Application Flow
- Code intro and Logging
- Validation and Transformation
- DB Operations
- Data Preprocessing
- Clustering
- Model Selection and Tuning
- Prediction
- Deployment

ML Project 9 :- Thyroid Detection

- Introduction
- The Problem Statement and Data Description
- The Application Flow
- Code intro and Logging
- Validation and Transformation
- DB Operation
- Data Preprocessing
- Clustering
- Model Selection and Tuning
- Prediction
- Deployment

ML Project 10 :- Visibility Climate

- Introduction

- The Problem Statement and Data Description
- The Application Flow
- Code intro and Logging
- Validations and Transformation
- DB Operations
- Data Preprocessing
- Clustering
- Model Selection and Tuning
- Prediction
- Deployment

Time Series

- Arima, Sarima, Auto Arima
- Time series using RNN LSTM, Prediction of NIFTY stock price
- Time series using RNN LSTM, Prediction of NIFTY stock price

DL ANN - Introduction

- Introduction to Deep Learning
- Importance of Deep learning
- Why you should study Deep Learning? (Motivation)
- ANN vs BNN
- The first Artificial Neuron

DL ANN - Perceptron

- Overview of Perceptron
- More about Perceptron
- Perceptron implementation using python - 1
- Perceptron implementation using python - 2
- Perceptron implementation using python - 3

- Perceptron implementation using python - 4
- Perceptron implementation using python - 5
- Perceptron implementation using python - 6
- Perceptron implementation using python - 7
- Python scripting & modular coding for Perceptron
- Python logging basics and docstrings
- Python packaging, Github actions, and PyPI

DL ANN -1

- Multilayer Perceptron
- Forward propagation
- Why we need an Activation function?
- ANN implementation using tf.keras - 1
- ANN implementation using tf.keras - 2
- ANN implementation using tf.keras - 3
- ANN implementation using tf.keras - 4
- ANN with Callbacks | Tensorboard | Early Stopping | Model Checkpointing

DL ANN - 2

- Vector
- Differentiation
- Partial differentiation
- Maxima and minima concept
- Gradient descent basics
- In-depth understanding of Gradient descent with mathematical proof

DL ANN - 3

- Chain rule
- Backpropagation

DL ANN - 4

- General problems in training Neural Networks
- Vanishing and Exploding gradients
- Activation Function Basics
- Weight initialization
- Activation Functions - 1
- Activation functions - 2
- Activation functions - 3
- Transfer learning
- Batch normalization -1
- Batch normalization -2
- Batch normalization -3

DL ANN - 5

- Introduction to fast optimizers
- Momentum optimization
- NAG
- Elongated bowl problem | AdaGrad
- RMSProp
- Adam
- Loss functions
- Regularization
- Dropout

Computer Vision - Introduction

- Introduction to Course
- Course Overview
- Installing Anaconda, Pycharm & Postman

- Working with Conda Envs
- Pycharm Introduction
- Pycharm with Conda
- Pycharm with venv
- Pycharm with Pipenv

Computer Vision - CNN Foundations

- Why CNN? Building an Intuition for CNN
- CNN, Kernels, Channels, Feature Maps, Stride, Padding
- Receptive Fields, Image Output Dimensionality Calculations, MNIST Dataset Explorations with CNN
- MNIST CNN Intuition, Tensorspace.js, CNN Explained, CIFAR 10 Dataset Explorations with CNN
- Dropout & Custom Image Classification Dog Cat Dataset
- Deployment in Heroku, AWS, Azure
- Deployment in GCP, AWS EBS

Computer Vision - CNN Architectures

- LeNet-5
- LeNet-5 Practical
- AlexNet
- AlexNet Practical
- VGGNet
- VGG16 Practical
- Inception
- Inception Practical
- ResNet
- Resnet Practical

Computer Vision - Image Classification Hyper Parameter Tuning

- Keras Tuner

- Building a simple model
- Tuning with Keras Tuner

Computer Vision - Data Augmentation

- What is Data Augmentation?
- Benefits of Data Augmentation
- Exploring Papers like RICAP, Random Erasing, Cutout
- Exploring Augmentor
- Exploring Roboflow

Computer Vision - Object Detection Basics

- What is Object Detection?
- Competitions for Object Detection
- Bounding Boxes
- Bounding Box Regression
- Intersection over Union (IoU)
- Precision & Recall
- What is Average Precision?

Computer Vision - Object Detection Architectures

- Object Detection Family
- RCNN
- RCNN Network Architecture
- Cons of RCNN
- FAST RCNN
- FAST RCNN Network Architecture
- Cons of FAST RCNN
- FASTER RCNN
- FASTER RCNN Network Architecture

- YOLO
- YOLO Architecture
- YOLO Limitations
- SSD
- SSD Network

Computer Vision - Practicals Object Detection using Tensorflow 1.x

- Introduction to TFOD1.x
- Using Google Colab with Google Drive
- Installation of Libraries in Colab
- TFOD1.x Setup in Colab
- Visiting the Model Zoo
- Inferencing in Colab
- Inferencing in Local
- Important Configurations Files
- Webcam Testing

Computer Vision - Practicals Training a Custom Cards Detector using Tensorflow1.x

- Custom Model Training in TFOD1.x
- Our Custom Dataset
- Doing Annotations or labeling data
- Selection of Pretrained Model from Model Zoo
- Files Setup for Training
- Let's start Training in Colab
- Export Frozen Inference Graph
- Inferencing with our trained model in Colab
- Training in Local
- Inferencing with our trained model in Local

Computer Vision - Practicals Creating an Cards Detector Web App with TFOD1

- Code Understanding
- WebApp Workflow
- Code Understanding
- Prediction with Postman
- Debugging our Application

Computer Vision - Practicals Object Detection using Tensorflow 2.x

- Introduction to TFOD2.x
- Using the Default Colab Notebook
- Google Colab & Drive Setup
- Visting TFOD2.x Model Garden
- Inference using Pretrained Model
- Inferencing in Local with a pretrained model

Computer Vision - Practicals Training a Custom Chess Piece Detector using Tensorflow2

- Custom Model training in TFOD2.x
- Our Custom Dataset TF2
- File Setup for Training
- Let's start Training
- Let's start Training
- Stop Training or resume Training
- Evaluating the trained model
- Convert CKPT to Saved Model
- Inferencing using the Custom Trained Model in Colab
- Inferencing using the Custom Trained Model in Local PC

Computer Vision - Practicals Creating an Chess Piece Detector Web App with TFOD2

- Creating a Pycharm project & Environment Setup TF2

- Application Workflow
- Code understanding
- Testing our App with Postman
- Debugging our Application

Computer Vision - Practicals Object Detection using Detectron2

- Introduction to Detectron2
- Detectron2 Colab Setup
- Visiting Detectron2 Model Zoo
- Detectron2 Pretrained Model Inferencing

Computer Vision - Practicals Training a Custom Detector using Detectron2

- Detectron2 Custom Training
- Exploring the Dataset
- Registering Dataset for Training
- Let's start Training
- Inferencing using the Custom Trained Model in Colab
- Evaluating the Model

Computer Vision - Practicals Creating an Custom Detector Web App with Detectron2

- Creating a Pycharm project & Environment Setup Detectron2
- Application Workflow
- Code understanding
- Testing our App with Postman
- Debugging our Application

Computer Vision - Practicals Object Detection using YoloV5

- Introduction to YoloV5
- YoloV5 Colab Setup
- Inferencing using Pre Trained Model

Computer Vision - Practicals Training a Custom Warehouse Apparel Detector using YoloV5

- Custom Training with YoloV5
- Exploring the Dataset
- Doing Annotations or labeling data
- Setting up Google Colab & Drive
- Let's start Training
- Inferencing using the Custom Trained Model in Colab

Computer Vision - Practicals Creating an Warehouse Apparel Detector Web App with YOLOV5

- Creating a Pycharm project & Environment Setup Yolo
- Application Workflow
- Code understanding
- Testing our App with Postman
- Debugging our Application

Computer Vision - Image Segmentation

- Segmentation Introduction
- From Bounding Box to Polygon Masks
- What is Image Segmentation?
- Types of Segmentation
- MASKRCNN
- MASK RCNN Architecture

Computer Vision - MASK RCNN Practicals with TFOD

- Segmentation with TFOD1.x
- Local Setup MASKRCNN
- Exploring the Dataset
- Data Annotation
- Model Selection

- Files Setup for Training
- Model Training
- Export Frozen Inference Graph
- Model Prediction

Computer Vision - MASKRCNN practical with Detectron2

- Introduction to Detectron2
- Detectron2 Colab Notebook
- Exploring the Model Zoo
- Detectron2 Colab Setup
- Custom Training with Detectron2
- Exploring our Dataset
- Data Annotation
- Data Preparation
- Setup for Training
- Let's start Training
- Inferencing using the Custom Trained Model in Colab
- Evaluating the Model

Computer Vision - Face Recognition Project

- Introduction to Project
- Requirement Gathering
- Techstack Selection
- Project Installation
- Project Demo
- Project Workflow
- Core Components of the Application
- Data Collection Module

- Generate Face Embeddings
- Training Face Recognition Module
- Prediction Pipeline
- Entry point of the Application
- Application Workflow
- Debugging our Application

Computer Vision - Object Tracking Project

- Object Tracking project
- Project Installation Tracking
- Project Demo
- Code Understanding

Computer Vision - GANS

- Introduction to GANS
- GAN Architecture
- GAN PRACTICALS Implementation

Computer Vision Project - Traffic Vehicle Detection

- Introduction to Vehicle Detection project
- Requirement Gathering
- Framework Selection
- Detailed Project Workflow
- Data Collection Scrap
- Data Preparation
- Data augmentation augementer
- Data Annotations
- Model Training
- Creating a Pycharm project & Environment Setup TVD

- WebApp Workflow
- Code Understanding
- Prediction with Postman
- Debugging our Application

Computer Vision Project - Helmet Detection

- Introduction to Helmet Detection project
- Requirement Gathering
- Techstack Selection
- Detailed Project Workflow
- Data Collection
- Data Preparation
- Data Augmentation
- Data Annotations
- Model Training
- Creating a Pycharm project & Environment Setup HD
- WebApp Workflow
- Code Understanding
- Prediction with Postman
- Debugging our Application

Computer Vision Project - Fashion Apparel Detection

- Introduction to Fashion Apparel Detection project
- Requirement Gathering
- Techstack Selection
- Detailed Project Workflow
- Data Collection
- Data Preparation

- Data Augmentation
- Data Annotations
- Model Training
- Creating a Pycharm project & Environment Setup FAD
- Project Demo
- WebApp Workflow
- Code Understanding
- Prediction with Postman
- Debugging our Application

Computer Vision Project - Image TO Text OCR

- Introduction to Project
- Project Installation OCR
- Project Demo
- Application Workflow
- Code Understanding
- Debugging our App
- Different OCR's available

Computer Vision Project - Shredder System

- Introduction to Shredder Systems
- Requirement Gathering
- Techstack Selection
- Data Collection
- Data Augmentation
- Data Preparation
- Data Annotation
- Model Selection from Zoo

- Model Training
- Creating a Pycharm project & Environment Setup SS
- Application Workflow
- Project Demo
- Code Understanding
- Debugging our Application
- Project Workflow
- Project Workflow

Computer Vision Project - Automatic Number plate Recognition with TFOD1.x

- Introduction to ANPR Project
- Requirement Gathering
- Tech Stack Selection
- Data Collection
- Data Augmentation
- Data Preparation
- Data Annotation
- Model Selection From Zoo
- Model Training
- Creating a Pycharm project & Environment Setup ANPR
- Application Workflow
- Create Google OCR API Key
- Project Demo
- Code Understanding
- Debugging our Application

NLP Overview

- NLP Overview

- NLP very basic

NLP Word Embeddings

- TFIDF
- Word Embeddings Part-1
- Word Embeddings Part-2

NLP RNN

- RNN basic
- RNN Implementation

NLP LSTM & GRU

- LSTM Introduction
- GRU

NLP Attention Based Model

- Encoder Decoder and Attention Mechanism
- Attention All You Need Paper Understanding

NLP Transfer Learning in NLP

- GPT and BERT Model
- SOTA Model with Paper Discussions
- Albert & DistillBert Project Discussion

NLP Project :- Megatron

- Megatron Project

NLP Project:- Brand Measures

- Brand Measures Project

NLP Project:- Text to Speech

- Introduction
- Project Setup Text to Speech
- Project Demo

- Code Explanation
- Project Workflow
- Prediction with Postman
- Debugging Application

NLP Project:- Speech To Text

- Introduction
- Project Setup Speech To Text
- Project Demo
- Code Explanation
- Project Workflow
- Prediction with Postman
- Debugging Application

NLP Project:- Spell Corrector

- Introduction
- Project Setup Spell Corrector
- Project Demo
- Code Explanation
- Project Workflow
- Prediction with Postman
- Debugging Application

NLP Project:- Named Entity Recognition

- NER using BERT

NLP Project:- Machine Translation & Keyword Spotting

- Machine Translation
- Keyword Spotting

NLP Project:- Keyword Extractor & Summarization

- Keyword Extraction
- Extractive Text Summarization

NLP project:- Paraphrasing

- Rephrase Project

BigData - Introduction to Big Data and Data Engineering

- Big Data Engineering

BigData - Introduction to Distributed Systems - Hadoop and MapReduce

- Big Data Engineering Introduction

BigData - Map Reduce & YARN

- Big Data Hadoop Map Reduce YARN
- Hadoop Map Reduce Hands On

BigData - Hive

- Apache hive

BigData - Hive Hands On

- Apache hive Hands On

BigData - NoSQL and Hbase

- Big Data HBase
- Hbase hands On

BigData - Sqoop

- Big Data Sqoop
- Big Data Sqoop Hands On

BigData - Spark

- Spark - Introduction
- Big Data Engineering using PySpark- RDDs
- Spark hands on - RDD
- Big Data Engineering using PySpark- Core, Internals, Architecture

- Apache Spark Actions_ Transformations
- Apache Spark Caching
- Big Data Engineering using PySpark- Shared Vars , Coalesce Repartition
- Big Data Engineering using PySpark- Dataframes
- Spark hands on - Dataframe
- Spark hands on - Databricks
- Big Data Engineering using PySpark- Catalyst& Tungsten

BigData - Spark ML

- Big Data Engineering using PySpark- MLlib
- Spark hands On - Spark ML Lib

BigData - Spark Streaming

- Big Data Engineering using PySpark- Streaming Part 1
- Big Data Engineering using PySpark- Streaming Part 2
- Spark hands On - Spark Streaming

BigData - Kafka

- Big Data Kafka
- Big Data Kafka Hands on

BigData - Apache Airflow - Workflow Management Platform

- Big Data - Airflow
- Big Data Airflow Hands On

Big Data Projects

- IoT Sensor data pipeline using Kafka-Spark Streaming
- Product Recommendation Engine using Kafka-Spark Streaming
- Short Video App Analytics

Basic Charts in Power BI

- 2.0 Basic Charts in Power BI Desktop

- 2.1 Column Chart in Power BI
- 2.2 Stacked Column Chart in Power BI
- 2.3 Pie Chart in Power BI
- 2.4 Donut Chart in Power BI
- 2.5 Funnel Chart in Power BI
- 2.6 Ribbon Chart
- 2.7 Include and Exclude
- 2.8 Export data from Visual

Cards and Filters

- 6.0 Cards and Filters in Power BI
- 6.1 Number Card
- 6.2 Text Card
 - 6.2.1 Formatting of Text Card
- 6.3 Date Card
 - 6.3.1 Date Card (Relative Filtering)
- 6.4 Multi-Row Card
- 6.5 Filter on Visual
- 6.6 Filter on This Page
- 6.7 Filter on All Pages
- 6.8 Drillthrough in Power BI

Objects in Power BI

- 9.1 Insert Image in Power BI
- 9.2 Insert Text in Power BI
- 9.3 Insert Shapes in Power BI
- 9.4 Insert Buttons in Power BI
- 9.5 Web URL Action in Power BI

- 9.6 Page Navigation Action in Power BI

- 9.7 Bookmark Action in Power BI

- 9.8 Drillthrough Action in Power BI

Power Query - Number Functions

- 13.0 Number Functions in Power Query (Power BI)

- 13.1 Basic Number Functions in Power Query (Power BI)

- 13.2 Percentage, Percent Of, Module in Power Query (Power BI)

- 13.3 Round Functions in Power Query (Power BI)

- 13.4 IsEven, IsODD, Sign in Power Query (Power BI)

Power Query - Append Files

- 14.1 Append multiple CSV files in a folder in Power Query (Power BI)

- 14.2 Append multiple excel sheets, Tables in Power Query (Power BI)

- 14.3 Append Excel sheets or Tables with different columns in Power BI

- 14.4 Append multiple Excel files from a folder in Power BI

- 14.5 Append different data sources in Power BI

Power Query - Merge Files

- 15.0 Merge Files and Tables in Power BI

- 15.1 Merge Sheets or Tables in Power Query (Power BI)

- 15.2 Merge Data from multiple Excel files or Workbooks in Power BI

- 15.3 Merge data from different data sources in Power Query (Power BI)

- 15.4 Merge data having multiple criteria in Power BI

Introduction to tableau

- Tableau Introduction

- Download and Install Tableau

- Tableau Vs Excel

Charts - 1

- Column Chart
- Horizontal Bar Chart
- Stacked Column Chart
- Stacked Bar Chart
- Keep Only, Exclude
- Keep Only, Exclude2_Normal
- Publish to Tableau Public

Charts - 2

- Pie Chart
- Multiple Pie Chart
- TreeMap_Editing
- Packed Bubble Chart
- Word Cloud OR Word Map
- Formatting payal

SQL

- Database Architecture
- Introduction to SQL
- Constraints
- Data Definition Language (DDL)
- Data Query Language (DQL)
- Data Manipulation Language (DML)
- Joins
- Import Export
- Aggregate Functions
- Order by, Having & Limit Clause
- String Functions

- Datetime functions
- Understanding Regular Expressions
- Nested Queries
- Views
- Stored Procedures
- WindowsFn
- Python-SQL Connectivity