Week 1: Feature Engineering and Cross-Validation

(Total video duration is nearly 3 hours 30 mins. You will be required to spend 60 - 80 minutes/day along with practicing datasets and quizzes)

"Model selection in Machine learning can be considered for both algorithm selection & defining the hyperparameters that work as an input for the model. A key challenge in the system is to select an appropriate model/ hyperparameters especially when no prior information is available. It is also important that the model being deployed yields the optimal results without overfitting or underfitting. This can be only achieved by modifying the necessary hyperparameters. This process of amending the hyperparameters is model tuning".

Learning Outcomes from Week-1:

- Need for data pre-processing
- Various tools and ways through which we obtain and transform data
- Analytical base table
- Bootstrap Sampling

- Exploring data through a pair plot
- The issue with multiple Gaussians
- Dealing with outliers
- K fold cross-validation
- Leave One Out Cross-validation

Mentor Session Duration:
2 hours

Faculty Name:
Prof. Mukesh Rao

No. of videos:
12

S.no	Video Name	Duration of the video(min)	Conceptual or Hands On
1.1	Introduction to Feature engineering	7.27	Conceptual
1.2	Hands on exercise - Feature engineering	50.28	Conceptual + Hands on
1.3	Lab exercise - Feature Engineering	50.50	Conceptual + Hands on
1.4	Cross validation concept and procedure	10.24	Conceptual
1.5	Implementing K Fold Cross Validation	7.02	Conceptual
1.6	Some salient features of K-fold	2.49	Conceptual

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S.no	Video Name	Duration of the video(min)	Conceptual or Hands On
1.7	Hands-on Implementation of K-Fold Cross Validation Technique	10.11	Conceptual + Hands on
1.8	Bootstrap Sampling Concept and Hands-on	16.52	Conceptual + Hands on
1.9	Leave one out Cross Validation (LOOCV) Concept	3.19	Conceptual
1.10	Hands-on Implementation of LOOCV Technique	1.39	Conceptual+Hands on
1.11	Up sampling and down sampling	7.54	Conceptual
1.12	Hands on exercise - Up-Sampling and Down-Sampling	28.43	Conceptual + Hands on

Few textbooks that you can refer to:

https://jakevdp.github.io/PythonDataScienceHandbook/

Python Machine Learning by Sebastian Raschka and Vahid Mirjalili

The Elements of Statistical Learning