Subject: 23CSE301

Lab Session: 07

Notes:

1. Please read the assignment notes carefully and comply to the guidelines provided.
2. Code should be checked into GitHub and the report to TurnItIn. Main Section (Mandatory):

Please use the data associated with your own project.

Ref:

- *https://scikit-learn.org/stable/modules/generated/sklearn.linear_model.Perceptron.html*
- *https://scikit-learn.org/stable/modules/generated/sklearn.model_selection.RandomizedSearchCV.html*
- *https://shap.readthedocs.io/en/latest/index.html*
- *https://towardsdatascience.com/explainable-ai-xai-with-shap-regression-problem-b2d63fdca670*
- *https://www.datacamp.com/tutorial/explainable-ai-understanding-and-trusting-machine-learning-models*
- *https://github.com/marcotcr/lime*
- *https://towardsdatascience.com/decrypting-your-machine-learning-model-using-lime-5adc035109b5*
- *https://www.geeksforgeeks.org/introduction-to-explainable-aixai-using-lime/*
- *https://www.datacamp.com/tutorial/explainable-ai-understanding-and-trusting-machine-learning-models*

A1. Continue your unfinished experiments from last lab class.

A2. Use cross-validation techniques (***`RandomizedSearchCV`***()) technique to tune the hyperparameters for your models.

A3. For projects dealing with classification problem, employ various other classifiers such as Support Vector Machines, Decision Tree, RandomForest, CatBoost, AdaBoost, XGBoost, Naïve-Bayes & MLP. Tabulate your results for your problem using different performance metrics. Your tabulated results should compare between train and test results and make appropriate observations.

A4. For projects dealing with regression problems, employ the regressors for above mentioned algorithms and tabulate your results.

A5. For projects dealing with clustering problems, please extend the implementation of various hierarchical and density-based clustering algorithms.

Optional Section:

O1. Study the usage of SHAP (SHapley Additive exPlanations) for usage as explainable tool for ML model behaviour. Use this tool for identifying feature importances for your classification problem.

O2. Study the features of LIME (Local Interpretable Model-agnostic Explanations) tool. Understand the ways the tool can be used for explaining the model behaviour. Use this tool to understand your model's behaviour.

Report Assignment:

Please update your last week's report in IEEE format. Refine your report to contain project related details only. Expand the methodology and results sections with outcomes of this experiments & results obtained. Please discuss your observations, inferences in results & discussion section. Please conclude the report appropriately with these experiments. Consider following points for observation analysis & inferences.

For better report writing, study carefully papers collected for literature survey and adopt the style.