

SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE			DEPARTMENT OF COMPUTER SCIENCE ENGINEERING	
Program Name: B. Tech		Assignment Type: Lab		Academic Year: 2025-26
Course Coordinator Name		Dr.Vairachilai Shenbagavel		
Instructor(s) Name		Srinivas Komakula		
Course Code	23CA201SE402	Course Title	Explainable AI(P)	
eYear/Sem	III/V	Regulation	R24	
Date and Day of Assignment	28-07-2025	Time(s)	09:00AM -05:00PM	
Duration	2 Hours	Applicable to Batches	23CSBTB34	
Assignment Number: 02				
Q. No.	Question			Expected Time to complete
1	Assignment: Feature Importance Analysis using SHAP			
<p>Objective</p> <p>To select a publicly available dataset from any domain, apply SHAP (SHapley Additive exPlanations) to identify important features, build a predictive model, and interpret the results in detail.</p> <p>Dataset Selection Guidelines</p> <p>Students choose datasets from the domain:</p> <p>❖ Environment & Climate – e.g., air quality, weather forecasting, pollution monitoring.</p> <p>Requirements for dataset selection:</p> <ul style="list-style-type: none">At least 500 rows of data.Minimum 5 independent variables (features).A clear target variable for classification or regression.Dataset must be publicly accessible (Kaggle, UCI Repository, government portals, etc.). <p>Tasks</p> <ul style="list-style-type: none">Data Collection & PreprocessingDownload the chosen dataset in .csv format/ or any.Load it into Python using Pandas.Handle missing values, duplicates, and outliers.Encode categorical variables if needed.Normalize or standardize data when required. <p>Model Building</p> <ul style="list-style-type: none">Split the dataset into training (80%) and testing (20%) sets.Choose a suitable model (e.g., Random Forest, Logistic Regression, XGBoost).Train and evaluate the model using relevant metrics:Classification: Accuracy, Precision, Recall, F1-score, ROC.Regression: RMSE,MSE, MAPE,MPE, MAE, R² score. <p>SHAP Implementation</p> <ul style="list-style-type: none">Install and import SHAP (pip install shap).Select an appropriate SHAP explainer (TreeExplainer, KernelExplainer, etc.).Compute SHAP values for the test set. <p>Generate and include:</p> <ul style="list-style-type: none">Summary plot – overall feature importance.Force plot – individual prediction explanation.				

- Waterfall plot – step-by-step feature contribution.

Result Interpretation

- Identify and explain the top 5 most influential features.
- Compare SHAP feature importance with the model's built-in feature importance (if available).
- Discuss whether the results are meaningful in the chosen domain.

Report Preparation

- Title Page – Assignment title, student name, roll number, date.
- Introduction – Problem statement and dataset overview.
- Dataset Description – Source, size, features, target variable.
- Preprocessing Steps – Cleaning and transformation details.
- Model & Performance – Algorithm choice, parameters, evaluation metrics.
- SHAP Analysis – Plots and explanations.

Conclusion – Key insights, limitations, and possible improvements.

Submission Requirements

- Python code file (.ipynb or .py).
- Dataset file (.csv).
- Report (.pdf) including SHAP plots and explanations.