| 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) | |
| **Year/Sem** III/V | **Regulation** R24 | |
| **Date and Day of Assignment** 28-08-2025 | **Time(s)** 09:00AM -05:00PM | |
| **Duration** 2 Hours | **Applicable to Batch** **23CSBTB50** | |

**Assignment Number:** 04

| Q. No. | Question | Expected Time to complete |
|---|---|---|
| 1 | **20 Newsgroups (Text Classification)** | |

**Objectives:**
- Use Permutation Importance to identify key words influencing text classification.
- Apply SHAP to visualize global importance of word features.
- Use LIME to explain predictions for two documents.
- Compare findings across methods.

**Assignment Details:**
- **Goal:** Understand how words drive text classification decisions.
- **Data:** sklearn.datasets.fetch_20newsgroups(subset='train'/'test').
- **Model:** LogisticRegression with TF-IDF vectorizer.
- **Steps:**
    1. Train LogisticRegression pipeline with TF-IDF features.
    2. **Permutation Importance:** Rank word features globally.
    3. **SHAP:** Produce summary plot + force plot for one document.
    4. **LIME:** Generate explanations for two different articles.
    5. Compare explanations across PI, SHAP, and LIME.
    **Deliverables:**
    o PI bar chart of word importance.
    o SHAP summary + local explanation.
    o LIME explanations for 2 documents.
    o Comparative analysis.

**Submission Requirements:**
- Short methods summary (3–5 lines).
- Clean, runnable code/notebook.
- All required plots (PI, SHAP, LIME).
- 5–10 bullet insights.