# NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

## 2021-2022

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| **Batch Number** | B-17 |
| **Team Members** | Y.Sowmya (21471A05E0)<br>Y.Madhavi (21471A05D9)<br>Sk.Chand Asmi (21471A05B9) |
| **Guide** | D.Venkata Reddy M.Tech |
| **Title** | Explainable Fetal Ultrasoung Classification Using CNN and MLP Models |
| **Domain/Technology** | DEEP LEARNING |
| **Base Paper Link** | https://www.sciencedirect.com/science/article/pii/S1877050924006513 |
| **Dataset Link** | https://zenodo.org/records/3904280 |
| **Software Requirements** | Python (3.6+), TensorFlow<br>PyTorch for deep learning,<br>tools like SHAP or LIME for explainability are essential. |
| **Hardware Requirements** | A powerful GPU (such as NVIDIA RTX 2080 or higher),<br>16GB of RAM, a high-speed SSD for storage,<br>and a multi-core CPU to handle data preprocessing<br>and other computational tasks. |
| **Abstract** | information about the anatomy of the fetus, thus helping healthcare professionals identify any abnormalities. Several AI tools are now being applied to classify fetal planes automatically. Accurate classification of fetal ultrasound image planes is crucial for the correct prenatal diagnosis and healthcare. However, while deep learning models have shown promise in image classifications, their ”black box” nature makes their decisions challenging to interpret, which is a significant concern in healthcare analytics. This paper addresses the problem of interpretability of the decisions made by a Convolutional Neural Network(CNN) for fetal ultrasound image classification using an XAI technique. Despite their accuracy, the established solutions lack the transparency essential for medical professionals to trust the model’s predictions. The LIME(Local Interpretable Model-agnostic Explanations) is applied to interpret the CNN classification that provides a high classification accuracy. The results of LIME interpretability model on the top of CNN highlight the critical regions that positively and negatively contribute to the classification decision. This approach offers a transparent and trusted solution for leveraging AI in prenatal diagnostics. |

**Signature of the student(s)** **Signature of the Guide** **Signature of the project coordinator**