# NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**2024-2025**

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| **Batch Number** | AB-10 |
| **Team Members** | K. Srinivasa Kalyan Ram (21471A0561)<br>T.Venkata Aravind (21471A0568)<br>SK.Khaja Mohiddin (21471A0554) |
| **Guide** | T. G. Ramnadh Babu |
| **Title** | Hand Gesture Recognition: Enhancing Accuracy and Precision with Deep Learning |
| **Domain/Technology** | Deep Learning |
| **Base Paper Link** | https://ieeexplore.ieee.org/document/10433143 |
| **Dataset Link** | https://drive.google.com/drive/folders/1wwvgYZ-1WkJ0RYAgN2be41vUCVqtMVtY |
| **Software Requirements** | Browser: Any latest browser like Chrome<br>Operating System: Windows 7 Server or later<br>Python (COLAB) |
| **Hardware Requirements** | **Processor Specifications:**<br>Number of Cores: 5<br>**Memory (RAM):** 8 GB<br>**Graphics Processing Unit (GPU):**<br>NVIDIA GTX 1060 (6 GB) or above |
| **Abstract** | Accurate, real-time recognition of hand gestures in dynamic environments remains challenging in human-computer interaction. This paper presents a hybrid deep learning model combining Convolutional Neural Networks (CNN) with Recurrent Neural Networks (RNN) using Long Short-Term Memory (LSTM) layers to capture both spatial and temporal information for dynamic hand gesture recognition. Trained on a dataset of six gestures—scroll-left, scroll-right, scroll-up, scroll-down, zoom-in, and zoom-out—the model achieves an accuracy of 95.59%, with an F1 score of 0.94 and an AUC-ROC of 0.95, indicating significant improvement over traditional models and practical viability in real-world applications. Key topics include data preprocessing, model architecture, hardware and software configurations, and performance comparisons with benchmarks. The paper concludes with discussions on limitations and future research directions to enhance the model's adaptability and efficiency. |

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