



**NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)**  
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**2024-2025**

<b>Batch Number</b>	DB3
<b>Team Members</b>	G.Venkatesh(21471A05M5) D.Sreenivas(22475A0521) M.Venkatesh(21471A05N6)
<b>Guide</b>	K.Suresh Babu M.Tech.,Ph.D
<b>Title</b>	Optimizing Class Imbalance and Enhancing Intrusion Detection in SDN Environments using Deep Learning Models.
<b>Domain/Technology</b>	DEEP LEARNING
<b>Base Paper Link</b>	<a href="https://ieeexplore.ieee.org/abstract/document/10353929">https://ieeexplore.ieee.org/abstract/document/10353929</a>
<b>Dataset Link</b>	<a href="https://www.kaggle.com/datasets/badcodebuilder/insdn-dataset">https://www.kaggle.com/datasets/badcodebuilder/insdn-dataset</a>
<b>Software Requirements</b>	Browser: Any latest browser like Chrome Operating System: Windows 7 Server or later Python (COLAB)
<b>Hardware Requirements</b>	System Type: Intel Core i5 or above RAM: 8 GB Number of cores:5 Number of Threads: 4
<b>Abstract</b>	This research aim is to addresses the critical issue of class imbalance in intrusion detection systems (IDS) in Software-Defined Net working environments. This paper introduces a novel approach that exploits advanced deep learning techniques to improve minority class attack detection, often missed because they are rare. Balancing the dataset using data synthesis with GAN and SMOTE, this study allows different classifiers to improve their performance. The research explores the effectiveness of multiple deep learning architectures, including MLPs, CNNs, and SNNs, in detecting intrusions. The results show that GAN based augmentation significantly outperforms traditional methods such as SMOTE, reducing false negatives and increasing overall detection accuracy. The paper also places an emphasis on the preprocessing technique of data that will include mean imputation as well as standardization techniques to enhance the input quality.

**Signature of the student(s)**

**Signature of the Guide**

**Signature of the project coordinator**