NARASARAOPETA ENGINEERING COLLEGE

(AUTONOMOUS)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

2024-2025

BATCH NUMBER	AB1
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GUIDE	Dr.S.V.N.Sreenivasu
TITLE	Boosting Network Intrusion Detection With Two-Level Ensemble Learning And Knowledge Distillation Approaches
DOMAIN/TECHNOLOGY	DEEP LEARNING AND ML
BASE PAPER LINK	https://ieeexplore.ieee.org/document/10540382
DATASET LINK	https://www.kaggle.com/datasets/hassan06/nslkdd
SOFTWARE REQUIREMENTS	Browser: Any latest browser like Chrome Operating System: Windows 10,64 bit Operating System Coding Language: Python (COLAB) Python distribution: Jupyter, VsCode
HARDWARE REQUIREMENTS	Processor: 11th Gen Intel® Core™ i3.1115G4 @ 3.00GHz 2.19 GHz Cache memory: 4MB(Megabyte) RAM: 8GB or more

ABSTRACT	An advanced IDS framework to complement the inadequacies of the traditional methods dealing with complex and diversified network flows is proposed in this paper. The framework comprehensively solved the two traditional problems of data imbalance and accuracy detection by adopting twolevel ensemble learning and knowledge distillation. The proposed system is tested with the NSL-KDD dataset, fusing several machine learning models to improve overall detection performance and leveraging knowledge distillation in transferring knowledge from an advanced complex model to an easy, simple, and computationally efficient one. These results prove significant improvement regarding the detection of both common and rare high-risk attacks; hence, the proposed IDS framework is truly robust and applicable for real-time applications in state-of-the-art network security.