

A Major Project Report
On
ANALYZING MACHINE LEARNING ALGORITHMS FOR INTRUSION
DETECTION IN IOT NETWORKS

Submitted in partial fulfilment of the requirements for the award of degree of

BACHELOR OF TECHNOLOGY
IN
COMPUTER SCIENCE AND ENGINEERING

Under the Guidance of

Dr. C. ANJANAMMA

Associate Professor

BY

MANKALA MANASA DEVI (21D21A05A5)

PATLOLLA NISHITHA (21D21A05B6)

SANIA MASROOR (21D21A05C4)



Department of Computer Science and Engineering

SRIDEVI WOMEN'S ENGINEERING COLLEGE

(An UGC Autonomous Institution)

(Estd. 2001 | Approved by AICTE & Govt. of TS | Affiliated to JNTUH

Accredited by NBA and NAAC (A++) | Certified with ISO 9001:2015)

V.N. Pally, Gandipet, Hyderabad-75

2024-25



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2024-25



CERTIFICATE

This is to certify that the MAJOR PROJECT report entitled “**ANALYZING MACHINE LEARNING ALGORITHMS FOR INTRUSION DETECTION IN IOT NETWORKS**” is being submitted by **Mankala Manasa Devi (21D21A05A5), Patlolla Nishitha (21D21A05B6), Sania Masroor (21D21A05C4)** in partial fulfillment for the award of degree of **Bachelor of Technology in Computer Science and Engineering** is a record of Bonafide work carried out by them.

INTERNAL GUIDE

COORDINATOR

**HEAD OF THE
DEPARTMENT**

Dr. C. ANJANAMMA

Associate Professor

Dr. D. NAZIMODDIN

Associate Professor

Dr. U. SRI LAKSHMI

Professor

EXTERNAL EXAMINER

DATE : 27-05- 2025

CERTIFICATE OF COMPLETION

This is to certify that the following students **MANKALA MANASA DEVI, PATLOLLA NISHITHA and SANIA MASROOR** bearing with **REG NO.: 21D21A05A5, 21D21A05B6 and 21D21A05C4** who are pursuing B.TECH (Computer Science & Engineering) at **SRIDEVI WOMEN'S ENGINEERING COLLEGE, HYDERABAD**, has successfully Completed their Mini Project Work at **TRUPROJECTS EDUCATIONAL SERVICES PRIVATE LIMITED** from **17th January, 2024 to 10th May, 2025** during the Major Project Work they worked on the Mini Project entitled **ANALYZING MACHINE LEARNING ALGORITHMS FOR INTRUSION DETECTION IN IoT NETWORKS**.

They were found punctual, hardworking and interested to learn the technologies during the Mini Project Work. They demonstrated good skills with self-motivate attitude towards learning.

Their association with the team was fruitful. We wish them all the best for future!

Tru Projects

J. Manoj Kumar
J MANOJ KUMAR

Managing Director



DECLARATION

We, hereby declare that Major Project entitled “**Analyzing Machine Learning Algorithms for Intrusion Detection in IoT Networks**” is the work done during the period from **17th January, 2025** to **10th May, 2025** and is submitted in partial fulfillment of the requirements for the award of degree of Bachelor of Technology in Computer Science and Engineering from Jawaharlal Nehru Technological University, Hyderabad.

MANKALA MANASA DEVI (21D21A05A5)

PATLOLLA NISHITHA (21D21A05B6)

SANIA MASROOR (21D21A05C4)

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MANKALA MANASA DEVI (21D21A05A5)

PATLOLLA NISHITHA (21D21A05B6)

SANIA MASROOR (21D21A05C4)

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ABSTRACT

This study presents a comprehensive analysis of machine learning algorithms in IoT Intrusion Detection Systems (IDS), focusing on critical aspects like accuracy, precision, recall, and F1 score. We examine the effect of data preparation methods—including normalization, outlier removal, standardization, and regularization—on model performance. The influence of dataset balancing, both balanced and unbalanced, is also assessed across four key IoT-focused datasets: CIC-IDS 2017, CIC-IoT-2023, IoT-ID20, and UNSW-NB15. To improve feature quality, ANOVA-based feature selection is applied. Eight algorithms, including Naive Bayes, K-Nearest Neighbors (KNN), AdaBoost, XGBoost, Support Vector Classifier (SVC), Logistic Regression, Decision Tree, and a Voting Classifier (comprising Boosted Decision Tree, Random Forest, and Bagging Extra Trees), are evaluated. Among these, the Voting Classifier ensemble demonstrated the highest performance in accuracy and overall classification metrics. This research highlights the potential of ensemble learning to optimize detection capabilities in IoT IDS, providing a robust framework for future developments in IoT security.