

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“Jnana Sangama”, Belagavi-560014, Karnataka



PROJECT REPORT ON

“INTRUSION DETECTION SYSTEM USING ADVANCED DEEP
LEARNING TECHNIQUES”

*SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
PROJECT*

**BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE & ENGINEERING**

Submitted By

DEEKSHITH R	(1SV18CS009)
RAKSHITHA RANGANATH	(1SV18CS034)
HEMA M S	(1SV20CS400)
SWATHI K M	(1SV20CS401)

Under the guidance of

Mr. Suthan R B.E.,M.Tech.,

Assistant Professor, Dept. of CSE.

M. S. S. S.
PRINCIPAL
S.I.T. TUMKUR.



Department of Computer Science and Engineering

SHRIDEVI INSTITUTE OF ENGINEERING AND TECHNOLOGY
(Affiliated To Visvesvaraya Technological University)

Sira Road, Tumakuru – 572106, Karnataka.

2022-2023



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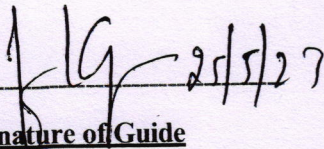
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CERTIFICATE

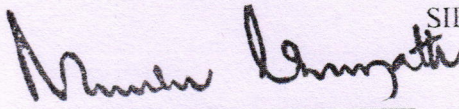
This is to certify that, the project entitled "INTRUSION DETECTION SYSTEM USING ADVANCED DEEP LEARNING TECHNIQUES" has been successfully carried out by Deekshith R [ISV18CS009], Rakshitha Ranganath [ISV18CS034], Hema M S [ISV20CS400], Swathi K M [ISV20CS401], in partial fulfillment for the award of **Bachelor of Engineering in Computer Science & Engineering** of the **Visvesvaraya Technological University, Belagavi** during the academic year **2022-23**. It is certified that all the corrections/suggestions indicated for internal assessments have been incorporated in there port. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the Bachelor of Engineering Degree.


25/5/23

Signature of Guide
Mr.Suthan R B.E.,M.Tech.,
Assistant Professor,
Dept.of CSE,
SIET, Tumakuru.

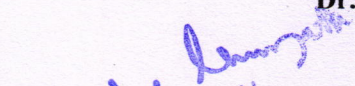

25/5/23

Signature of H.O.D
Dr.Basavesha D B.E.,M.Tech,Phd
Associate Professor & HOD
Dept.of CSE,
SIET, Tumakuru.



Signature of Principal

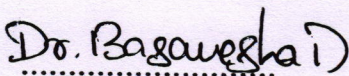
Dr.Narendra Viswanath M.E.,Ph.D., MIE, MISTE, MIWS., FIV.,
Principal,
SIET,Tumakuru

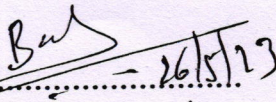

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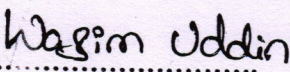
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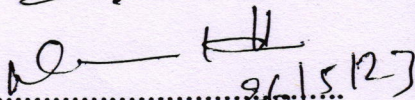
Name of the Examiners

Signature with Date

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DECLARATION

We, Deekshith R [ISV18CS009], Rakshitha Ranganath [ISV18CS034], Hema M S [ISV20CS400], Swathi K M [ISV20CS401], student of VIII semester B.E in Computer Science & Engineering, at Shridevi Institute of Engineering & Technology, Tumakuru, here by declare that, the project work-II entitled "INTRUSION DETECTION SYSTEM USING ADVANCED DEEP LEARNING TECHNIQUES", embodies the Report of our project work carried out by our team under the guidance of **Mr. Suthan R, Assistant Professor, Department of CSE, SIET, Tumakuru** as partial fulfillment of requirements for the award of the degree in **Bachelor of Engineering in Computer Science & Engineering of Visvesvaraya Technological University, Belagavi**, during the academic year 2022-23. The project has been approved as it satisfies the academic requirements in respect to the Project work.

Place: Tumakuru

Date: 26-5-2023

Student Name & Signature

Deekshith R

[ISV18CS009]

Rakshitha Ranganath

[ISV18CS034]

Hema M S

[ISV20CS400]

Swathi K M

[ISV20CS401]

Principal Signature
PRINCIPAL
S.I.E. TUMKUR

ACKNOWLEDGEMENT

This project work will be incomplete without thanking the personalities responsible for this venture, which other wise would not have become areality.

We express our profound gratitude to **Dr.Narendra Viswanath**, Principal, S.I.E.T, for his moral support towards completing our project work.


We would like to thank Head of Department **Dr.Basavesha D** BE,M Tech,Phd Associate Professor, & Head of the Department of CSE, SIET for providing all the support and facility.

We would like to thank my guide **Mr.Suthan R** BE,M.Tech, **Assistant Professor**, Department of computer Science and Engineering, SIET for his help, sharing his technical expertise and timely advice.

We whole heartedly thank, **Mr.Girish L**, Assistant Professor, Project coordinator, Department of Computer Science and Engineering, for the support.

We would like to express our sincere gratitude to all teaching and non-teaching faculty of the department of CSE for guiding us throughout the course of this project by giving valuable suggestion and encouragement.

By,


PRINCIPAL
S.I.E. TUMKUR

DeekshithR	[1SV18CS009]
HemaMS	[1SV20CS400]
RakshithaRanganath	[1SV18CS034]
SwathiKM	[1SV20CS401]



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Date: 22/05/2023

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Mr. DEEKSHITH R** bearing USN **1SV18CS009** Student of **Shridevi Institute of Engineering & Technology** has successfully completed his Project Work titled "Intrusion Detection System Using Advanced Deep Learning Techniques".

We wish every success in his career.

For ShriTEK Innovations

Geet
Authorized Signature



N. Srinivas Kumar
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SIET, TUMKUR.



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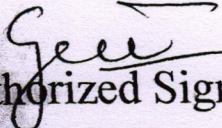
Date: 22/05/2023


TO WHOM SO EVER IT MAY CONCERN

This is to certify that Ms. RAKSHITHA RANGANATH bearing USN 1SV18CS034 Student of Shridevi Institute of Engineering & Technology has successfully completed her Project Work titled "Intrusion Detection System Using Advanced Deep Learning Techniques".

We wish every success in her career.

For ShriTEK Innovations


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Date: 22/05/2023

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Ms. HEMA M S bearing USN 1SV20CS400 Student of Shridevi Institute of Engineering & Technology has successfully completed her Project Work titled "Intrusion Detection System Using Advanced Deep Learning Techniques".

We wish every success in her career.

For ShriTEK Innovations

N. Srinivas Kumar
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Date: 22/05/2023

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Ms. SWATHI K M** bearing USN **1SV20CS401** Student of **Shridevi Institute of Engineering & Technology** has successfully completed her Project Work titled "Intrusion Detection System Using Advanced Deep Learning Techniques".

We wish every success in her career.

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Principal
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ABSTRACT

Intrusion Detection Systems (IDS) play a crucial role in safeguarding computer networks and systems from unauthorized access, malicious activities, and cyber threats. Traditional IDS techniques often rely on predefined rules or signatures, which can struggle to detect new or evolving attack patterns. To address this limitation, advanced deep learning techniques have emerged as a promising approach for building more robust and adaptive IDS.

This paper presents an Intrusion Detection System using Advanced Deep Learning (IDS-ADL) that leverages the power of deep neural networks to enhance the accuracy and effectiveness of intrusion detection. The proposed IDS-ADL model is designed to automatically learn and identify network intrusions by analyzing network traffic data.

The IDS-ADL model consists of multiple components, including data preprocessing, feature extraction, deep neural network architecture, and training procedures. In the data preprocessing stage, raw network traffic data is collected and transformed into a suitable format for deep learning analysis. Feature extraction techniques, such as packet-level or flow-level features, are applied to capture meaningful representations of network behavior.

The core of the IDS-ADL model lies in its deep neural network architecture, which is specifically designed to handle the complexity and variability of network traffic data. This architecture may include convolutional neural networks (CNNs), recurrent neural networks (RNNs), or a combination of both, to capture spatial and temporal dependencies in the data.

The training procedures involve feeding labeled network traffic data into the IDS-ADL model and optimizing its parameters through backpropagation and gradient descent algorithms. The model is trained to distinguish between normal network behavior and various types of intrusions, such as denial-of-service (DoS) attacks, intrusions attempts, or unauthorized access.

Experimental evaluation and performance analysis of the IDS-ADL model are conducted using publicly available benchmark datasets, such as the NSL-KDD or UNSW-NB15 datasets. The evaluation metrics include accuracy, precision, recall, F1 score, and area under the receiver operating characteristic curve (AUC-ROC), which demonstrate the effectiveness of the proposed approach.

The results show that the IDS-ADL model outperforms traditional IDS techniques, achieving higher detection rates and lower false positive rates. The model's ability to adapt and learn from new attack patterns makes it well-suited for detecting emerging threats and zero-day attacks.

Differential testing can be applied to variou

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