

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
Jnana Sangama, Belagavi - 590018



Project Report

on

**“LEVERAGING ANN FOR TARGETED DRUG
SENSITIVITY PREDICTION ON GDSC DATA”**

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

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE & ENGINEERING

by

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

MANGALORE INSTITUTE OF TECHNOLOGY & ENGINEERING

(A Unit of Rajalaxmi Education Trust ®, Mangalore)

Autonomous Institute Affiliated to V.T.U, Belagavi, Approved by AICTE, New Delhi

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CERTIFICATE

Certified that the project work entitled **Leveraging ANN for Targeted Drug Sensitivity Prediction on GDSC Data** carried out by **Mr. KARTHIK U SHETTIGAR (USN: 4MT21CS064)** a bonafide student of **Mangalore Institute of Technology & Engineering** in partial fulfillment for the award of **Bachelor of Engineering in Computer Science & Engineering** of the **Visvesvaraya Technological University, Belagavi**, during the year **2024-25**. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the Report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project Work prescribed for the said Degree.

Signature of the Guide

Mrs. Suma K

Signature of the HOD

Dr. Ravinarayana B

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Name of the Examiners

Signature with Date

1.

2.

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DECLARATION

I, **KARTHIK U SHETTIGAR** (4MT21CS064) student of 7th semester BE in Computer Science & Engineering, **Mangalore Institute of Technology and Engineering, Moodabidri**, hereby declare that the project work entitled “**Leveraging ANN for Targeted Drug Sensitivity Prediction on GDSC Data**”, submitted to the **Visvesvaraya Technological University, Belagavi** during the academic year **2024-25**, is a record of an original work done by us under the guidance of **Mrs. Suma K**, Assistant Professor, Department of Computer Science & Engineering, Mangalore Institute of Technology and Engineering Moodabidri. This project work is submitted in partial fulfillment of the requirements for the award of the degree of Bachelor of Engineering in Computer Science & Engineering. The results embodied in this report have not been submitted to any other University or Institute for the award of any degree.

Date:

KARTHIK U SHETTIGAR

Place: MOODABIDRI

ABSTRACT

Personalized medicine is transforming cancer treatment by tailoring therapies to the genetic variations found in cancer cells, significantly improving patient responses to specific drugs. This project, titled "Leveraging ANN for Targeted Drug Sensitivity Prediction on GDSC Data", utilizes a machine learning approach with Artificial Neural Networks (ANN) to predict drug sensitivity in cancer cell lines using data from the Genomics of Drug Sensitivity in Cancer (GDSC) dataset. The model focuses on predicting IC₅₀ values, a key measure of drug effectiveness, by integrating genomic features such as gene mutations, gene expression profiles, and copy number alterations (CNAs) to identify potential biomarkers for personalized therapies. The system employs an ANN architecture that captures complex nonlinear relationships within the genomic data, optimizing predictions with techniques like normalization, feature selection, and hyperparameter tuning. The approach uses a Flask-based web interface that enables users to easily input genomic data through labeled form fields, ensuring accessibility without the need for file uploads. The interface displays IC₅₀ predictions in real-time, making it suitable for both clinical and research use. Model performance is evaluated using key metrics like Mean Squared Error (MSE), Mean Absolute Error (MAE) and R-squared (R^2). Visualization tools further enhance interpretability, displaying the comparison between predicted and actual IC₅₀ values. This project highlights the potential of ANN models in advancing personalized oncology treatment by providing actionable drug response insights based on genomic data. Future work will focus on integrating additional datasets, enhancing multi-omics data integration, and conducting clinical validation to ensure broader applicability in real-world cancer therapies.

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