**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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**Under the Guidance of Mrs. Suma K**

#### Assistant Professor



##### DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

## MANGALORE INSTITUTE OF TECHNOLOGY & ENGINEERING

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##### 2024-25



**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.

|  |  |  |
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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:

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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 (R²). 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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#### KARTHIK U SHETTIGAR

**TABLE OF CONTENTS**

|  |  |
| --- | --- |
| **Contents** | **Page No** |
| **ABSTRACT** | i | |
| **ACKNOWLEDGEMENT** | ii | |
| **TABLE OF CONTENTS** | iii | |
| **LIST OF FIGURES** | Vi | |
| **LIST OF TABLES** | vii | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Chapter no** | | | | | **TITLE** | | |  | | | |
| **1.** | | | | | **INTRODUCTION** | | | 1-4 | | | |
| 1.1 | | | | | Introduction | | | 1 | | | |
| 1.2 | | | | | Problem Statement | | | 2 | | | |
| 1.3 | | | | | Objectives | | | 3 | | | |
| 1.4 | | | | | Scope of the project | | | 3 | | | |
| 1.5 | | | | | Organization of the report | | | 4 | | | |
| **2** | | | | | **LITERATURE SURVEY** | | | 5-8 | | | |
| 2.1 | | | | | Existing System | | | 5 | | | |
| 2.2  2.3 | | | | | Limitations of existing systems  Proposed System | | | 7  8 | | | |
| **3** | | | | | **SYSTEM REQUIREMENTS SPECIFICATION** | | | 9-13 | | | |
| 3.1 | | | | | Overall description | | | 9 | | | |
|  | | | | | 3.1.1 Product Perspective | | | 9 | | | |
|  | | | | | 3.1.2 Product Functions | | | 10 | | | |
|  | | | | | 3.1.3 User classes and Characteristics | | | 10 | | | |
|  | | | | | 3.1.4 Design and Implementation constraints | | | 10 | | | |
|  | | | | | 3.1.5 Assumptions and Dependencies | | | 10 | | | |
| 3.2 | | | | | Specific Requirements | | | 11 | | | |
|  | | | | | 3.2.1 Hardware Requirements  3.2.1 Software Requirements | | | 11  11 | | | |
| 3.3 | | | | | | Functional Requirements | | | 12 | | | |
|  | | | | | | 3.3.1 Model Development and Prediction  3.3.1 User Interface and Accessibility | | | 12  12 | | | |
|  | | | | | | 3.3.3 Model Validation and Evaluation | | | 12 | | | |
|  | | | | | | 3.3.4 Data Security | | | 13 | | | |
| 3.4 | | | | | | Non-Functional Requirements | | | 13 | | | |
|  | | | | | | 3.4.1 Usability  3.4.1 Reliability | | | 11  11 | | | |
|  | | | | | | 3.4.3 Performance | | | 13 | | | |
|  | | | | | | 3.4.4 Maintainability | | | 13 | | | |
|  | | | | |  | | |  | | | |
| **4** | | | | | **GANTT CHART** | | | | | | 15-16 | | | | |
| **5** | | **SYSTEM DESIGN** | | | 17-22 | | | | | | | |
| 5.1 | Architecture Diagram | | | | | | 17 | | | | | | |
| 5.2 | Use Case Diagram and Description | | | | | | 19 | | | | | | |
| 5.3 | Sequence Diagram | | | | | | 20 | | | | | | |
| 5.4 | Activity Diagram | | | | | | 21 | | | | | | |
| 5.5 | Data flow Diagram | | | | | | 22 | | | | | | |
| **6** | | **IMPLEMENTATION** | | | 23-28 | | | | | | | |
| 6.1 | | Module Implementation | | | 23 | | | | | | | |
| 6.2 | | Data Preprocessing | | | 23 | | | | | | | |
| 6.3 | | Model Development | | | 24 | | | | | | | |
| 6.4 | | Web Interface Development | | | 27 | | | | | | | |
| 6.5 | | Deployment | | | 28 | | | | | | | |
| **7** | | **TESTING** | | | 29-32 | | | | | | | |
| 7.1 | | System Testing | | | 29 | | | | | | | |
| 7.2 | | Testing Methodology | | | 29 | | | | | | | |
| 7.3 | | Test cases | | | 29 | | | | |
| 7.4 | | Evaluation Metrics | | | 31 | | | | |
| 7.5 | | Test Results and Analysis | | | 31 | | | | |
| 7.6 | | Challenges and Resolutions | | | 32 | | | | |
| **8** | | **RESULTS AND SNAPSHOTS** | | | 33-39 | | | | |
| 8.1 | | | | Introduction | | | 33 | | | | |
| 8.2 | | | | Model Performance Metrics | | | 33 | | | | |
| 8.3 | | | | Visualizations of Model Predictions | | | 34 | | | | |
| 8.4 | | | | Snapshots of Web Interface | | | 36 | | | | |
| 8.5 | | | | User Feedback | | | 38 | | | | |
| 8.6 | | | | Observations and Insights | | | 39 | | | | |
|  | |  | | |  | | | | |
| **9** | | **CONCLUSION AND FUTURE WORK** | | | 40 | | | | |
| 9.1 | | Conclusion | | | 40 | | | | |
| 9.2 | | Future Work | | | 41 | | | | |
| **REFERENCES** | | | | | | 43 | | | | | |
| **PAPERS PRESENTED** | | | | | | 44 | | | | | |

## LIST OF FIGURES

|  |  |  |
| --- | --- | --- |
| **Figure No.** | **Figure Name** | **Page No.** |
| Figure 4.1 | Gantt Chart | 16 |
| Figure 5.1 | Architectural Diagram | 18 |
| Figure 5.2 | Use Case Diagram | 19 |
| Figure 5.3 | Sequence Diagram | 20 |
| Figure 5.4 | Activity Diagram | 21 |
| Figure 5.5 | Data Flow Diagram | 22 |
| Figure 8.1 | Error Metrics for Model Evaluation | 34 |
| Figure 8.2 | Actual vs Predicted LN\_IC50 Values | 34 |
| Figure 8.3 | Training vs Testing Loss | 35 |
| Figure 8.4 | Drug Response Prediction | 35 |
| Figure 8.5 | Home Page | 36 |
| Figure 8.6 | Predicted IC50 Page | 37 |
| Figure 8.7 | Drug Lookup Page | 38 |
| Figure 8.8 | Drug Response Prediction | 38 |

**LIST OF TABLES**

|  |  |  |
| --- | --- | --- |
| **Table No.** | **Table Name** | **Page No.** |
| Table 4.1 | Gantt Chart of Planning and Scheduling of Project | 15 |
| Table 7.1 | Test Cases | 30 |