

HEART FAILURE PREDICTION

*A Project Report submitted in the partial fulfilment of the
requirements for the award of the degree*

BACHELOR OF TECHNOLOGY

In

COMPUTER SCIENCE AND ENGINEERING

Submitted by

K.Prasanthi (17471A05E0)

Under the esteemed guidance of

Dr. S.V.N.Sreenivasu, M.Tech., Ph.D.

professor



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)
NARASARAOPET

(Affiliated to JNTUK, Kakinada, Approved by AICTE & Accredited by NBA)

2020-2021

NARASARAOPETA ENGINEERING COLLEGE (AUTONOMOUS)
NARASARAOPET
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING



CERTIFICATE

This is to certify that the project entitled “**HEART FAILURE PREDICTION**” is a bonafide work done by **K.Prasanthi(17471A05E0)** in partial fulfilment of the requirements for the award of the degree of **BACHELOR OF TECHNOLOGY** in the Department of **COMPUTER SCIENCE AND ENGINEERING** during 2020-2021.

PROJECT GUIDE

Dr. S.V.N.Sreenivasu, M.Tech., Ph.D.
Professor

PROJECT CO-ORDINATOR

Mrs. M. Sireesha, M.Tech.,(Ph.D.)
Assoc. Professor

HEAD OF THE DEPARTMENT

Dr. S. N. Tirumala Rao, M.Tech., Ph.D.

EXTERNAL EXAMINER

ACKNOWLEDGEMENT

We wish to express our thanks to various personalities who are responsible for the completion of the project. We are extremely thankful to our beloved Chairman, **Sri M. V. Koteswara Rao Garu**, B.Sc., who took keen interest on us in every effort throughout the course. We owe our gratitude to our Principal, **Dr. M. Sreenivasa Kumar**, M.Tech., Ph.D.(UK), MISTE., FIE(I), for his kind attention and valuable guidance throughout the course.

We express our deep felt gratitude to **Dr. S. N. Tirumala Rao**, M.Tech., Ph.D., Head, Department of Computer Science and Engineering and our Guide **Dr.S.V.N.Sreenivasu**, M.Tech., Ph.D., Professor of CSE department whose valuable guidance and unstinting encouragement enable us to accomplish our project successfully in time.

We extend our sincere thanks to **Mrs. M. Sireesha**, M.Tech., (Ph.D.), Co-ordinator of the project for extending her encouragement. Their profound knowledge and willingness have been a constant source of inspiration for us throughout this project work.

We extend our sincere thanks to all other Teaching and Non-Teaching Staff of CSE department for their cooperation and encouragement during the course. We have no words to acknowledge the warm affection, constant inspiration and encouragement that we receive from our parents.

We affectionately acknowledge the encouragement received from our friends and those who involved in giving valuable suggestions and clarifying our doubts which had really helped us in successful completion of our project.

By

K.Prasanthi(17471A05E0)

ABSTRACT

Heart failures are the number 1 cause of death globally, taking an estimated 17.9 million lives each year. CVDs are a group of disorders of the heart and blood vessels and include coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions. Four out of 5 CVD deaths are due to heart attacks and strokes, and one third of these deaths occur prematurely in people under 70 years of age. Most cardiovascular diseases can be prevented by addressing behavioural risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity and harmful use of alcohol using population-wide strategies. Individuals at risk of CVD may demonstrate raised blood pressure, glucose, and lipids as well as overweight and obesity. These can all be easily measured in primary care facilities. Identifying those at highest risk of CVDs and ensuring they receive appropriate treatment can prevent premature deaths. Access to essential noncommunicable disease medicines and basic health technologies in all primary health care facilities is essential to ensure that those in need receive treatment and counselling.

INDEX

| S.NO. | CONTENTS | PAGE NO |
|--------------|--|----------------|
| 1. | Introduction | 1 |
| | 1.1 Introduction | 1 |
| | 1.2 Existing system | 2 |
| | 1.3 Proposed system | 2 |
| | 1.4 System Requirements | 3 |
| | 1.4.1 Hardware Requirements | 3 |
| | 1.4.2 Software Requirements | 3 |
| 2. | Literature Survey | 4 |
| | 2.1 Machine Learning | 4 |
| | 2.2 Some Machine Learning methods | 4 |
| | 2.3 Applications of Machine Learning | 5 |
| | 2.4 Prevalence of Heart Failure | 5 |
| | 2.5 Importance of ML in healthcare | 6 |
| | 2.6 Implementation of ML using Python | 6 |
| | 2.7 Machine Learning Products | 9 |
| 3. | System Analysis | 10 |
| | 3.1 Scope of the project | 10 |
| | 3.2 Analysis | 10 |
| | 3.3 Data Preprocessing | 11 |
| | 3.3.1 Missing Values | 11 |
| | 3.4 Removing of outliers | 13 |
| | 3.5 Feature selection | 13 |
| | 3.5.1 Correlation | 13 |
| | 3.6 Classification | 14 |
| | 3.6.1 ML algorithms for classification | 14 |
| | 3.7 Confusion matrix | 18 |
| | 3.8 SMOTE | 20 |
| 4. | Implementation Code | 22 |
| 5. | Result Analysis | 31 |
| 6. | Screenshots | 32 |
| 7. | Conclusion | 34 |
| 8. | Future Scope | 35 |
| 9. | References | 36 |

LIST OF FIGURES

| S.NO | CONTENTS | PAGE NO |
|-------------|---|----------------|
| 1. | Figure 1.3.1:Proposed System | 3 |
| 2. | Figure 2.4.1:Death Event | 5 |
| 3. | Figure 3.2.1:Data Set | 11 |
| 4. | Figure 3.3.1:Missing data visualization with NULL values | 12 |
| 5. | Figure 3.3.1:Missing data visualization without NULL values | 12 |
| 6. | Figure 3.4.1:Outliers in Dataset | 13 |
| 7. | Figure 3.5.1:Correlation for heart failure prediction dataset | 14 |
| 8. | Figure 3.6.1:Decision tree classifier | 15 |
| 9. | Figure 3.6.2:Random forest classifier | 16 |
| 10. | Figure 3.6.3:K-Nearest Neighbours | 17 |
| 11. | Figure 3.7.1:Confusion matrix | 18 |
| 12. | Figure 3.8.1:Class distribution before SMOTE technique | 20 |
| 13. | Figure 3.8.2: Class distribution after SMOTE technique | 21 |
| 14. | Figure 5.1:comparision of accuracy of algorithms | 31 |
| 15. | Figure 6.1:Main page | 32 |
| 16. | Figure 6.2:Prediction Yes | 32 |
| 17. | Figure 6.3:Prediction No | 33 |

