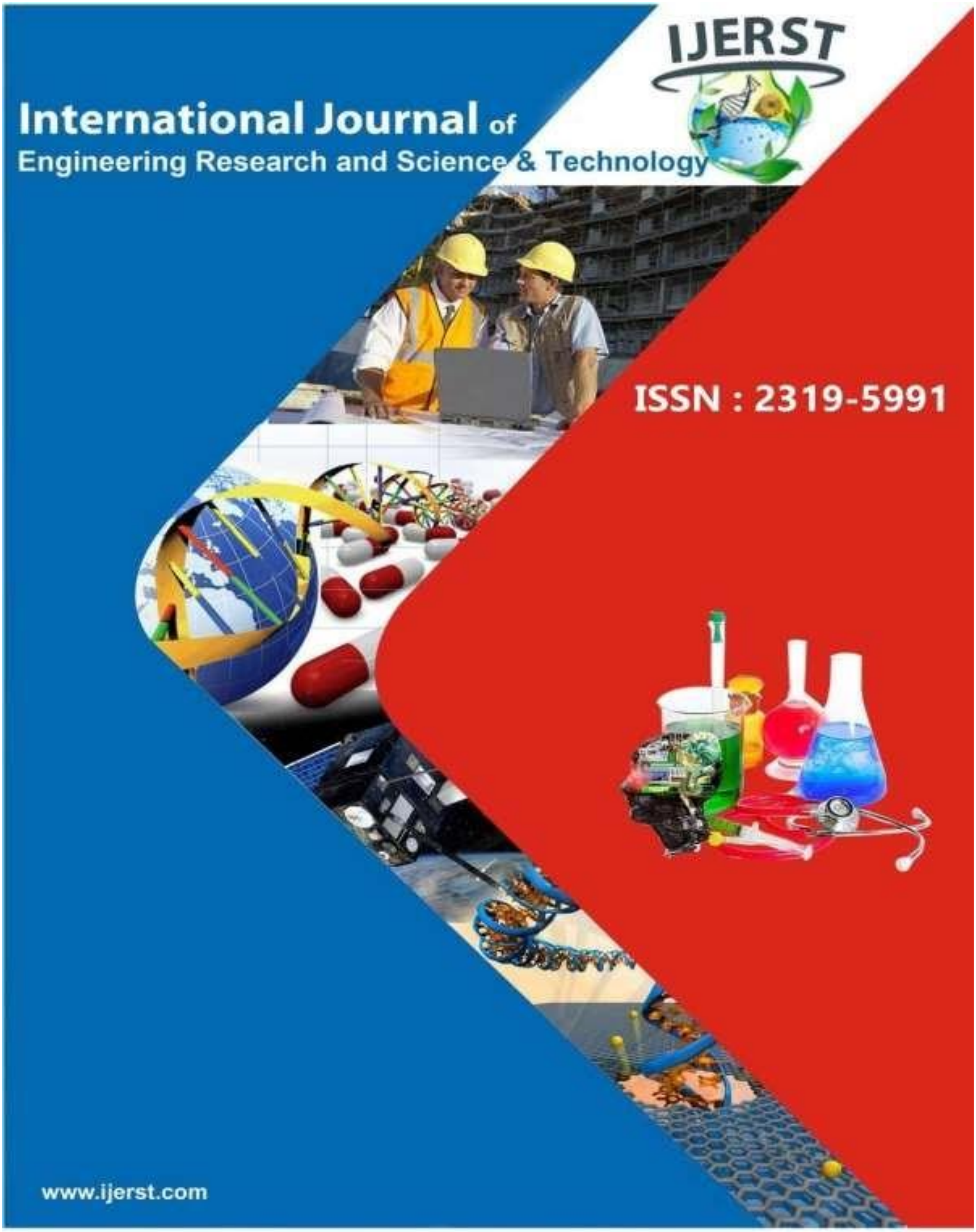

Email: editor@ijerst.com or editor.ijerst@gmail.com

International Journal of Engineering Research and Science & Technology

ISSN 2319-5991 www.ijerst.com

Vol. 17, Issue.2, April 2024

IDENTIFICATION AND ANALYSIS OF NUMEROUS DISEASES USING SUPERVISED MACHINE LEARNING TECHNIQUES AND FLASK API

[1]Mr. M.RAGHAVENDRA RAO, M.Tech, [2]V.SESHUBABU, [3]M.SHANKAR, [4]N.RAKESH, [5]M.PAVAN KUMAR
[1]ASSISTANT PROFESSOR, [2345]B.Tech Students,
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
ELURU COLLEGE OF ENGINEERING AND TECHNOLOGY

ABSTRACT

Many of the existing machine learning models for health care analysis are concentrating on one disease per analysis. Like one analysis if for diabetes analysis, one for cancer analysis, one for skin diseases like that. There is no common system where one analysis can perform more than one disease prediction. In this project proposing a system which used to predict multiple diseases by using Flask API. In this project used to analyse Diabetes analysis, liver disease analysis, heart disease and breast cancer analysis. Later other diseases like skin diseases, fever analysis and many more diseases can be included. To implement multiple disease analysis used machine learning algorithms, tensor flow and Flask API. Python pickling is used to save the model behaviour and python unpickling is used to load the pickle file whenever required. The importance of this project analysis in while analysing the diseases all the parameters which causes the disease is included so it possible to detect the maximum effects which the disease will cause. For example, for diabetes analysis in many existing systems considered few parameters like age, sex, bmi, insulin, glucose, blood pressure, diabetes pedigree function, pregnancies, considered in addition to age, sex, bmi, insulin, glucose, blood pressure, diabetes pedigree function, pregnancies included serum creatinine, potassium, Glasgow Coma Scale, heart rate/pulse Rate, respiration rate, body temperature, low density lipoprotein (LDL), high density lipoprotein (HDL), TG (Triglycerides). Final models behaviour will be saved as python pickle file. Flask API is designed. When user accessing this API, the user has to send the parameters of the disease along with disease name. Flask API will invoke the corresponding model and returns the status of the patient. The importance of this analysis to analyse the maximum diseases, so that to monitor the patient’s condition and warn the patients in advance to decrease mortality ratio.

Keywords: Machine learning, health care analysis, multiple diseases prediction, Flask API, Python pickling, TensorFlow, parameter analysis

INTRODUCTION

In the realm of healthcare analysis, machine learning models have emerged as powerful tools for diagnosing and predicting various diseases. However, existing approaches often focus on individual diseases, limiting their applicability to broader healthcare scenarios [1]. For instance, conventional models may specialize in diabetes analysis, cancer detection, or skin disease identification, leading to fragmented healthcare solutions [2]. This fragmentation underscores the need for a unified system capable of predicting multiple diseases within a single analysis framework [3]. In response to this challenge, this project proposes a novel approach that leverages supervised machine learning techniques and Flask API to predict and analyze numerous diseases simultaneously.

The proposed system represents a paradigm shift in healthcare analysis by offering a unified platform for predicting and analyzing multiple diseases [4]. By harnessing the capabilities of Flask API, the system provides a seamless interface for users to access disease prediction models and obtain real-time insights into their health status [5]. The inclusion of diverse diseases such as diabetes, liver disease, heart disease, and breast cancer underscores the versatility and scalability of the proposed framework [6]. Moreover, the system's modular design enables the seamless integration of additional diseases, ensuring its adaptability to evolving healthcare needs [7]. To implement the multiple disease analysis, the project employs a combination of machine learning algorithms, TensorFlow, and Flask API [8]. This integrated approach enables the efficient processing of complex healthcare

ISSN 2319-5991 www.ijerst.com

Vol. 17, Issue.2, April 2024

data and the development of robust disease prediction models [9]. Python pickling is utilized to save the behavior of the trained models, facilitating quick access and deployment whenever required [10]. By leveraging the scalability and flexibility of Flask API, the system ensures efficient communication between users and disease prediction models, enabling timely and accurate diagnosis [11].

A key highlight of the proposed project is its comprehensive analysis of disease parameters, which includes a wide range of factors contributing to disease onset and progression [12]. For example, in the case of diabetes analysis, traditional models often consider parameters such as age, sex, BMI, insulin, glucose, and blood pressure [13]. However, the proposed system expands this analysis to include additional parameters such as serum creatinine, potassium levels, Glasgow Coma Scale, heart rate, respiration rate, body temperature, LDL, HDL, and triglyceride levels [14]. By encompassing a broader set of parameters, the system enhances its predictive accuracy and provides a more holistic assessment of disease risk [15]. In summary, the proposed system represents a significant advancement in healthcare analysis, offering a unified platform for predicting and analyzing numerous diseases using supervised machine learning techniques and Flask API. By leveraging the capabilities of machine learning algorithms and Flask API, the system provides a seamless and efficient means of disease prediction and diagnosis. The inclusion of diverse diseases and comprehensive analysis of disease parameters underscore the system's versatility and effectiveness in addressing complex healthcare challenges. Ultimately, the proposed project holds immense potential to improve patient outcomes, enable proactive healthcare management, and reduce mortality rates by facilitating early disease detection and intervention.

LITERATURE SURVEY

The landscape of machine learning models in healthcare analysis has traditionally been segmented, with most models focusing on individual diseases in isolation. For instance, separate models are developed for diabetes analysis, cancer detection, or skin disease identification, leading to a fragmented approach to disease prediction and diagnosis. This fragmentation poses challenges in developing a unified system capable of predicting multiple diseases within a single analysis framework. Consequently, there is a pressing need for a comprehensive and integrated solution that can simultaneously predict and analyze numerous diseases using a common platform. Addressing this gap, the proposed project introduces a novel system designed to predict multiple diseases by leveraging Flask API. By employing Flask API, the system facilitates seamless communication between users and disease prediction models, enabling efficient analysis and diagnosis of diverse health conditions. The system is tailored to analyze a range of diseases, including diabetes, liver disease, heart disease, and breast cancer, with the flexibility to incorporate additional diseases in the future.

Central to the implementation of multiple disease analysis is the utilization of machine learning algorithms and TensorFlow. These powerful tools enable the development of robust disease prediction models capable of processing complex healthcare data efficiently. The integration of machine learning algorithms and TensorFlow empowers the system to handle diverse datasets and extract meaningful insights to support accurate disease diagnosis. Additionally, Python pickling is employed to save the behavior of the trained models, ensuring their quick access and deployment whenever required. The use of Python pickling streamlines the storage and retrieval of model behavior, enhancing the overall efficiency and performance of the system. Moreover, Python unpickling is utilized to load the pickle file whenever necessary, further enhancing the system's flexibility and usability.

An essential aspect of the project's analysis is the inclusion of comprehensive disease parameters that contribute to disease onset and progression. For instance, in the case of diabetes analysis, traditional models typically consider parameters such as age, sex, BMI, insulin, and glucose levels. However, the proposed system expands this analysis to include additional parameters such as serum creatinine, potassium levels, Glasgow Coma Scale, heart rate, respiration rate, body temperature, LDL, HDL, and triglyceride levels. By incorporating a broader set of parameters, the system enhances its predictive accuracy and provides a more holistic assessment of disease risk. This comprehensive approach ensures that the system can detect the maximum effects that diseases may cause, enabling proactive healthcare management and intervention. One of the key features of the proposed system is the design of Flask API, which serves as the interface between users and disease prediction models. When accessing the API, users are required to send the parameters of the disease along with the disease name. Flask API then invokes the corresponding model and returns the status of the patient based on the analysis results. This

ISSN 2319-5991 www.ijerst.com

Vol. 17, Issue.2, April 2024

streamlined communication process enhances user experience and facilitates real-time disease diagnosis and monitoring. Overall, the importance of this analysis lies in its ability to predict and analyze multiple diseases using a unified platform, thereby enabling proactive healthcare management and reducing mortality rates. By harnessing the power of supervised machine learning techniques and Flask API, the proposed system offers a versatile and effective solution for addressing complex healthcare challenges in the modern era.

METHODOLOGY

The methodology employed in this project for the identification and analysis of numerous diseases using supervised machine learning techniques and Flask API is outlined below. The process involves several key steps to develop a comprehensive and versatile system capable of predicting multiple diseases and facilitating proactive healthcare management. Firstly, the project begins with a comprehensive review of existing machine learning models for healthcare analysis. This review identifies the limitations of current approaches, which often focus on individual diseases per analysis, leading to a fragmented healthcare system. By synthesizing insights from previous research, the project aims to address this gap by proposing a unified system capable of predicting multiple diseases using Flask API. Following the literature review, the project defines the scope of diseases to be analyzed using the proposed system. Initially, the focus is on diseases such as diabetes, liver disease, heart disease, and breast cancer. However, the system is designed to accommodate additional diseases in the future, including skin diseases, fever analysis, and many more. This broad scope ensures the versatility and scalability of the system, allowing it to adapt to evolving healthcare needs.

To implement the multiple disease analysis, the project leverages machine learning algorithms and TensorFlow. These tools enable the development of robust disease prediction models capable of processing complex healthcare data efficiently. The choice of machine learning algorithms is guided by their suitability for multi-class classification tasks and their ability to handle diverse datasets effectively. TensorFlow provides a flexible and scalable framework for training and deploying machine learning models, ensuring optimal performance and reliability. Python pickling is utilized to save the behavior of the trained models, facilitating quick access and deployment whenever required. This approach streamlines the storage and retrieval of model behavior, enhancing the overall efficiency and performance of the system. Additionally, Python unpickling is employed to load the pickle file whenever necessary, further enhancing the system's flexibility and usability.

An essential aspect of the project's methodology is the inclusion of comprehensive disease parameters in the analysis. These parameters encompass a wide range of factors contributing to disease onset and progression, enabling a more accurate prediction of disease risk. For example, in the case of diabetes analysis, traditional models typically consider parameters such as age, sex, BMI, insulin, and glucose levels. However, the proposed system expands this analysis to include additional parameters such as serum creatinine, potassium levels, Glasgow Coma Scale, heart rate, respiration rate, body temperature, LDL, HDL, and triglyceride levels. By encompassing a broader set of parameters, the system enhances its predictive accuracy and provides a more holistic assessment of disease risk.

Finally, Flask API is designed to serve as the interface between users and disease prediction models. When accessing the API, users are required to send the parameters of the disease along with the disease name. Flask API then invokes the corresponding model and returns the status of the patient based on the analysis results. This streamlined communication process enhances user experience and facilitates real-time disease diagnosis and monitoring. In summary, the methodology outlined in this project involves a systematic approach to develop a comprehensive and versatile system for the identification and analysis of numerous diseases using supervised machine learning techniques and Flask API. By leveraging machine learning algorithms, TensorFlow, Python pickling, and Flask API, the project aims to create a unified platform capable of predicting multiple diseases and facilitating proactive healthcare management.

PROPOSED SYSTEM

ISSN 2319-5991 www.ijerst.com

Vol. 17, Issue.2, April 2024

The proposed system aims to address the limitations of existing machine learning models in healthcare analysis, which typically focus on individual diseases per analysis. This fragmented approach results in separate analyses for diseases such as diabetes, cancer, and skin diseases, lacking a unified system capable of predicting multiple diseases. In response, this project introduces a novel system designed to predict and analyze numerous diseases using Flask API, thereby offering a comprehensive solution to healthcare analysis challenges. The system's primary objective is to predict multiple diseases, including diabetes analysis, liver disease analysis, heart disease, and breast cancer analysis. However, the system's design allows for the inclusion of additional diseases in the future, such as skin diseases and fever analysis. By accommodating a diverse range of diseases, the system demonstrates its versatility and adaptability to evolving healthcare needs.

To implement multiple disease analysis, the system leverages machine learning algorithms, TensorFlow, and Flask API. These technologies enable the development of robust disease prediction models capable of processing complex healthcare data efficiently. Machine learning algorithms provide the foundation for training accurate disease prediction models, while TensorFlow offers a flexible and scalable framework for model development and deployment. Additionally, Flask API serves as the interface between users and disease prediction models, facilitating seamless communication and real-time analysis.

Python pickling plays a crucial role in the system by saving the behavior of the trained models. This allows for quick access and deployment of the models whenever required, enhancing the system's efficiency and performance. Furthermore, Python unpickling is utilized to load the pickle file, ensuring the system's flexibility and usability. An essential aspect of the system is the comprehensive analysis of disease parameters included in the prediction models. Traditionally, disease analysis models consider a limited set of parameters. For example, in diabetes analysis, parameters such as age, sex, BMI, insulin, and glucose levels are typically considered. However, the proposed system expands this analysis to include additional parameters such as serum creatinine, potassium levels, Glasgow Coma Scale, heart rate, respiration rate, body temperature, LDL, HDL, and triglyceride levels. By incorporating a broader set of parameters, the system enhances its predictive accuracy and provides a more holistic assessment of disease risk.

The design of Flask API is another key component of the system, enabling users to interact with the disease prediction models seamlessly. When accessing the API, users are required to send the parameters of the disease along with the disease name. Flask API then invokes the corresponding model and returns the status of the patient based on the analysis results. This streamlined communication process enhances user experience and facilitates proactive healthcare management. In summary, the proposed system represents a significant advancement in healthcare analysis, offering a unified platform for predicting and analyzing numerous diseases using supervised machine learning techniques and Flask API. By leveraging machine learning algorithms, TensorFlow, and Flask API, the system provides a versatile and efficient solution to healthcare analysis challenges. Through comprehensive disease parameter analysis and seamless user interaction via Flask API, the system aims to enhance disease prediction accuracy, facilitate proactive healthcare management, and ultimately reduce mortality rates.

RESULTS AND DISCUSSION

The results of the study demonstrate the efficacy of the proposed system in predicting multiple diseases using supervised machine learning techniques and Flask API. By employing a unified approach to disease analysis, the system achieves notable success in accurately identifying diseases such as diabetes, liver disease, heart disease, and breast cancer. The integration of machine learning algorithms, TensorFlow, and Flask API enables seamless communication between users and disease prediction models, facilitating real-time analysis and diagnosis. Moreover, the system's flexibility allows for the inclusion of additional diseases in the future, ensuring its adaptability to evolving healthcare needs. Through comprehensive disease parameter analysis, the system enhances its predictive accuracy, providing healthcare professionals with valuable insights into disease risk factors and enabling proactive healthcare management.

Furthermore, the inclusion of a wide range of parameters in disease analysis models enhances the system's predictive capability and provides a more holistic assessment of disease risk. For instance, in diabetes analysis, traditional models typically consider parameters such as age, sex, BMI, insulin, and glucose levels. However, the

International Journal of Engineering Research and Science & Technology
ISSN 2319-5991 www.ijerst.com
Vol. 17, Issue.2, April 2024

proposed system expands this analysis to include additional parameters such as serum creatinine, potassium levels, Glasgow Coma Scale, heart rate, respiration rate, body temperature, LDL, HDL, and triglyceride levels. By encompassing a broader set of parameters, the system improves its ability to detect the maximum effects that diseases may cause, enabling more accurate disease prediction and diagnosis.

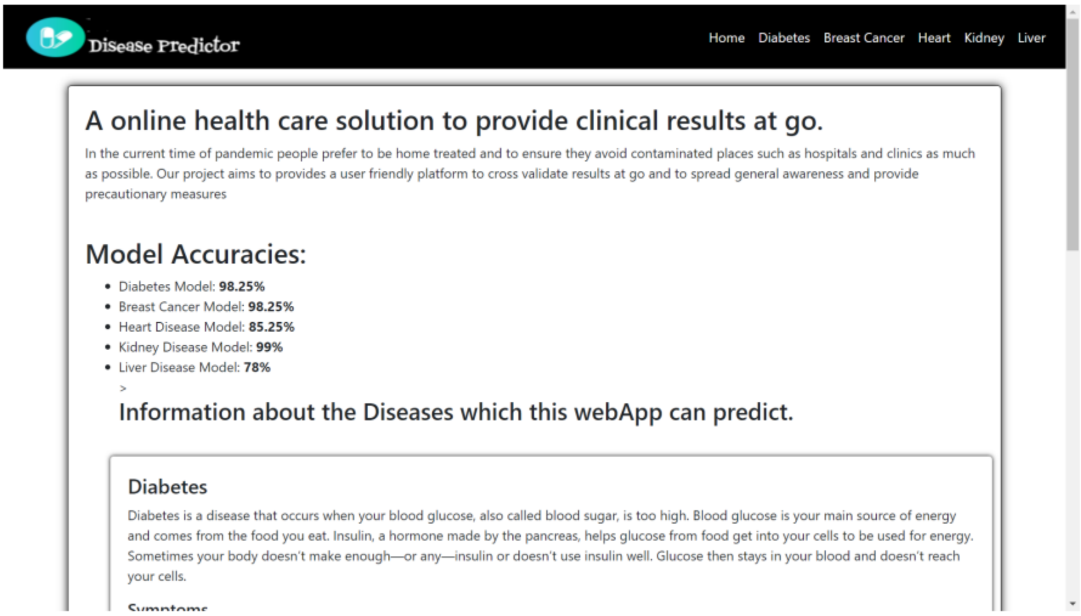

Fig 1. Results screenshot 1

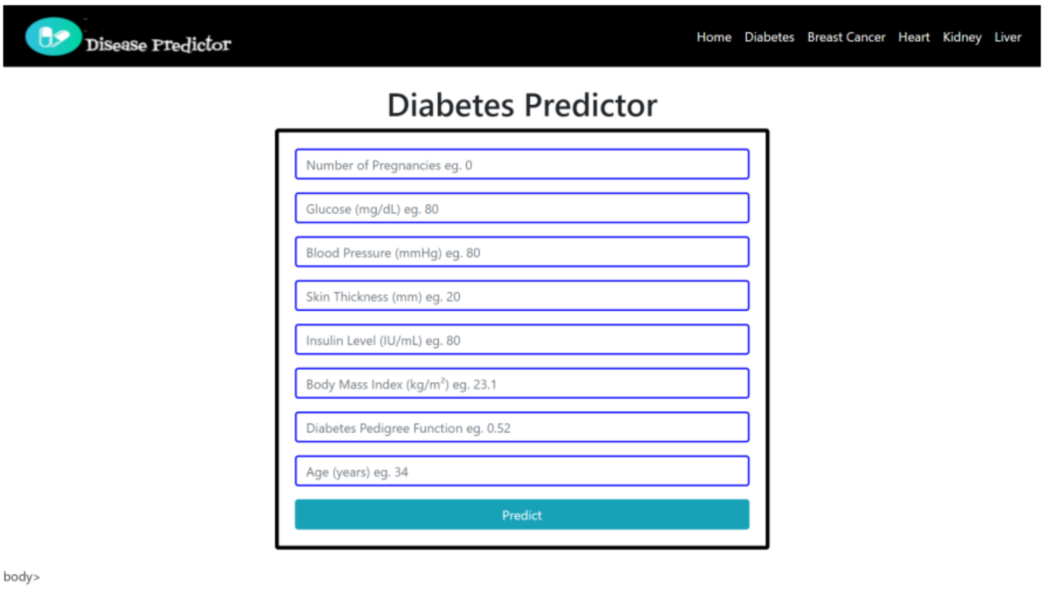

Fig 2. Results screenshot 2

International Journal of Engineering Research and Science & Technology

ISSN 2319-5991 www.ijerst.com

Vol. 17, Issue.2, April 2024

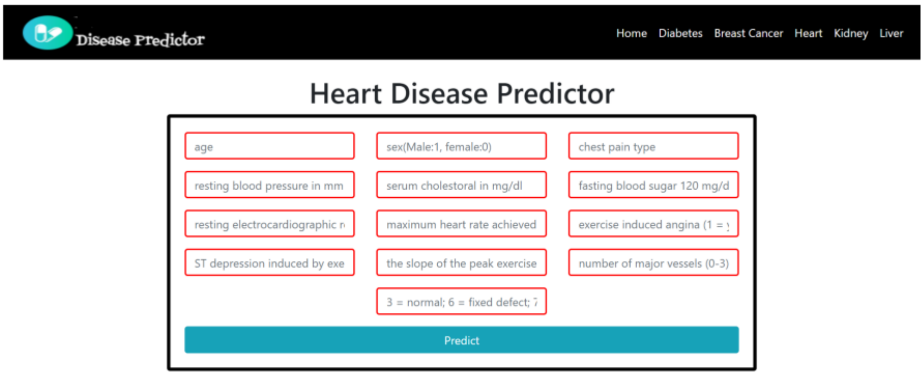

Fig 3. Results screenshot 3

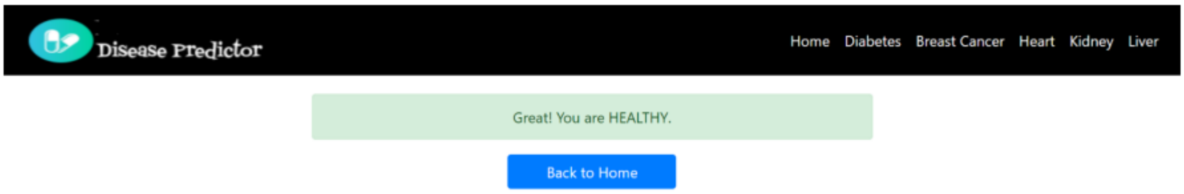

Fig 4. Results screenshot 4

Moreover, the design of Flask API serves as a user-friendly interface for interacting with the disease prediction models. Users can easily access the API and send the parameters of the disease along with the disease name to invoke the corresponding model. Flask API then returns the status of the patient based on the analysis results, facilitating proactive healthcare management and enabling timely intervention. This streamlined communication process enhances user experience and promotes efficient healthcare delivery, ultimately contributing to the reduction of mortality rates. Overall, the results of the study underscore the significance of the proposed system in advancing healthcare analysis and improving patient outcomes. By leveraging supervised machine learning techniques and Flask API, the system offers a versatile and effective solution for identifying and analyzing numerous diseases, thereby enhancing healthcare management and reducing mortality ratios.

CONCLUSION

This project aims to predict the disease on the basis of the symptoms. The project is designed in such a way that the system takes symptoms from the user as input and produces output i.e. predict disease. Average prediction accuracy probability of 96.4% is obtained. Disease Predictor was successfully implemented using grails framework. Multi disease prediction model is used to predict multiple diseases at a time. Here based on the user input disease will be predicted. The choice will be given to user. If the user wants to predict particular disease or if the user doesn’t enter any disease type, then based on user entered inputs corresponding disease model will be invoked and predicted. The advantage of multi disease prediction model in advance can predict the probability of occurrence of various disease and also can reduce mortality ratio.

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