PROJECT REPORT

On

Mediscan: An Multidisease Identification and Prognosis System using AI

Submitted By

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Submitted in partial fulfilment of

"PROJECT–I (PROJCS702)" Course Work of

VII Semester of Bachelor of Technology

Guided By,

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

S. B. JAIN INSTITUTE OF TECHNOLOGY, MANAGEMENT & RESEARCH, NAGPUR

(An Autonomous Institute, Affiliated to RTMNU, Nagpur)

2023-2024

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- Emerge as a leading Institute for developing competent and creative Professionals.

❖ Institute Mission:

- Providing Quality Infrastructure and experienced faculty for academic excellence.
- Inculcating skills, knowledge and opportunities for competency and creativity.
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- Be successful professionals through lifelong learning with allied objectives of higher education or research.

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SESSION 2023-2024

CERTIFICATE

This is to certify that the Project Report titled **"Mediscan: An Multidisease Identification and Prognosis System using AI"** submitted by **Mr. Tanishq Sakhare** has been accepted under the guidance of **Mr. Prasanna Lohe** and **Mr. Mayur Kadu.** This Project work is carried out for the partial fulfilment of "**PROJECT–I (PROJCS702)"** Course Work of VII Semester of Bachelor of Technology in **Computer Science & Engineering, S. B. Jain Institute of Technology, Management & Research, An Autonomous Institute, Affiliated to RTMNU, Nagpur.**

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Designation: _____

Institution: _____

Date: _____

DECLARATION

We hereby declare that the Project Report titled **"*Mediscan: An Multidisease Identification and Prognosis System using AI*"** submitted herein has been carried out by us in the Department of Computer Science & Engineering of S. B. Jain Institute of Technology Management and Research, Nagpur under the guidance of **Mr. Prasanna Lohe and Mr. Mayur Kadu**. Thework is original and has not been submitted earlier as a whole or in part for the award ofany degree / diploma at this or any other Institution / University.

Rohan Kadoo _____

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ABSTRACT

Mediscan is an integrated framework that leverages a diverse dataset encompassing a wide spectrum of medical conditions. Through the amalgamation of machine learning algorithms and deep neural networks, the system demonstrates an exceptional proficiency in concurrently identifying numerous diseases. By ingesting various inputs such as medical images, patient records, and clinical notes, the system offers a comprehensive diagnostic approach. The system further extends its capabilities by integrating cutting-edge image recognition models. These models have been fine-tuned to decipher intricate details within medical images like X-rays, MRIs, and CT scans. As a result, Mediscan facilitates rapid and precise detection of anomalies, playing a pivotal role in early disease detection and differentiation. Chronic diseases such as cancer, diabetes, strokes, arthritis, and cardiac related disease are the major and leading cause of high mortality and disability rates in India as well as worldwide. Developing a convincing and favorable solution for these diseases is the need of the hour. The development and Technological advancements in medical science have proved beneficial in detecting the initial stage among patients and providing accurate data analysis among them. The authenticity and accuracy of the diagnosis and consequent treatment depend upon the correct analysis of patient's incorrect diagnosis or over diagnosis may lead to casualty. In our Multidisease Identification and Prognosis system, we trained the model for five diseases i.e. Heart disease, Brain tumor, Skin disease, lung disease, and diabetes. So, we have achieved 98% accuracy on heart disease, 97% accuracy on Brain disease, 90% accuracy on Skin disease, 87% accuracy on Lung-related diseases, and 97% accuracy on diabetes with the help of different machine learning and deep learning algorithms in our Project. We used different algorithms for trained the model like VGG 16, Dense Net, Res Net 50, Random Forest, Sequential to trained our multiple diseases model. In the end, we created the whole web application for easy and understandable user interaction and to fulfill the requirements of patients.

Keywords/Index Terms— *Machine learning, Deep Learning, Training, Prognosis, Multiple diseases, overdiagnosis, misdiagnosis, analysis, Mediscan.*

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ABBREVIATION

ABBREVIATION	FULL FORM
CNN	Convolutional Neural Network
VGG	Visual Geometry Group
RNN	Recurrent Neural Network
MRI	Magnetic Resonance Imagine
CSV	Comma Separated Value
GLCM	Grayscale Co-Occurrence Matrix
PSL	Pigmented Skin Lesions
REPL	Read-Eval Print loop
AI	Artificial Intelligence
DL	Deep Learning
ML	Machine Learning
HTML	Hypertext Markup Language
CSS	Cascading Style Sheet
GPU	Graphics Processing Unit
IDE	Integrated Development Environment
CPU	Central Processing unit
DOM	Document Object Models
MLP	Multilayer Perceptron

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CHAPTER NO 1

INTRODUCTION

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INTRODUCTION

1.1 PROJECT BACKGROUND

In recent years, the integration of artificial intelligence (AI) into various sectors has brought about transformative advancements, and the field of healthcare is no exception. The ability of AI to process complex data, recognize patterns, and make informed decisions has paved the way for more accurate and efficient medical diagnoses and prognoses. This paper introduces "Mediscan," a cutting-edge Multi-Disease Identification and Prognosis System that harnesses the capabilities of AI to revolutionize the landscape of medical diagnosis and patient care. The challenge of identifying and prognosticating multiple diseases in a timely and precise manner has long been a central concern in the healthcare industry. Traditional diagnostic approaches often rely on the manual interpretation of medical images, clinical data, and patient history, which can be time-consuming and prone to human error. Moreover, the simultaneous presence of multiple co-existing diseases in a patient further complicates the diagnostic process. Mediscan addresses these challenges by capitalizing on the advancements in AI, particularly in the realms of machine learning, image recognition, and natural language processing. The system is designed to not only identify a wide range of diseases from various diagnostic inputs but also provide insights into the potential trajectory of these diseases, enabling healthcare professionals to make informed decisions about patient care. Mediscan is an integrated framework that leverages a diverse dataset encompassing a wide spectrum of medical conditions. Through the amalgamation of machine learning algorithms and deep neural networks, the system demonstrates an exceptional proficiency in concurrently identifying numerous diseases.

AI models within the system are trained on extensive datasets to recognize patterns, symptoms, and risk factors associated with multiple diseases simultaneously. This enables rapid and accurate disease identification, even in cases where diseases coexist or present with atypical symptoms.

1.2 PROBLEM STATEMENT

The field of healthcare is characterized by the complexity and diversity of diseases, often requiring accurate and timely diagnosis for effective treatment. However, the traditional diagnostic approaches are limited by their reliance on manual analysis and expertise, leading to potential errors, delays, and missed opportunities for early intervention. Moreover, the increasing volume of medical data, including images, patient records, and clinical notes, poses a significant challenge for healthcare practitioners to efficiently and comprehensively identify and prognose multiple diseases simultaneously. In light of these challenges, the development of an advanced Multi-Disease Identification and Prognosis System using AI, referred to as "Mediscan," aims to revolutionize disease diagnosis and patient care. This system seeks to leverage the power of artificial intelligence to accurately and efficiently identify a wide range of diseases from various diagnostic inputs while also providing prognostic insights for personalized treatment planning. In contemporary healthcare, the accurate and timely identification of multiple diseases in patients is a complex and resource-intensive challenge. Traditional diagnostic methods often rely on individual expertise and subjective interpretation, which can lead to delayed diagnoses and suboptimal treatment outcomes. To address these issues, there is an imperative need to develop a Multi-Disease Identification and Prognosis System leveraging Machine Learning (ML) and Deep Learning (DL) techniques. These systems go beyond simple diagnosis by providing healthcare professionals with valuable insights into disease progression and prognosis. By analyzing historical patient data, treatment outcomes, and the latest medical research, AI algorithms can predict how a disease is likely to develop and recommend personalized treatment plans.

1.3 PURPOSE OF STUDY

The study aims to create an AI-powered system capable of accurately identifying Multiple diseases from a variety of diagnostic inputs. This includes medical images (such as X-rays, MRIs, and CT scans), patient records, clinical notes, and other relevant data sources. The system will utilize advanced machine learning algorithms and image recognition techniques to achieve high levels of accuracy and efficiency in disease identification. Mediscan aims to go beyond disease identification by incorporating prognostic capabilities. The system will utilize historical patient data, treatment outcomes, and disease progression patterns to predict the potential course of a disease for an individual patient. This prognostic information will enable healthcare providers to design personalized treatment plans and interventions, ultimately improving patient outcomes. By automating the disease identification and prognosis processes, the study aims to save valuable time for healthcare professionals. The system's rapid and accurate analysis will expedite the diagnostic process, allowing clinicians to focus more on patient care and treatment decisions. The primary contribution of this study is the development of an AI-driven healthcare solution that integrates disease identification and prognosis. The system's accuracy and efficiency have the potential to revolutionize medical practice by providing healthcare providers with a comprehensive tool to aid in diagnosis, prognosis, and treatment planning.

Aim:

The primary aim of this project is to develop a comprehensive Multidisease Identification and Prognosis System using AI and Machine Learning / Deep Learning (DL) techniques.

Objectives:

- To identify multiple diseases.
- Advancement of Machine Learning Techniques.
- To Enhance Patient Care.
- Support for Healthcare Decision making.
- Real-Time Analysis.

1.4 TECHNOLOGICAL BASE

This Project can be implemented by using various technologies like-

FLASK

Flask is a lightweight WSGI web application framework. It is designed to make getting started quick and easy, with the ability to scale up to complex applications. It began as a simple wrapper around Werkzeug and Jinja and has become one of the most popular Python web application frameworks. Flask provides the essential tools and features needed for web development, such as routing, request handling, and template rendering. Developers can build web applications quickly without a steep learning curve. Flask uses a simple and intuitive routing system that allows developers to map URLs to specific view functions. This makes it easy to define routes and create different endpoints for your application.

Advantages of Flask –

- **Built-In Development Server**

  Flask comes with a built-in development server, making it easy to test and debug applications during the development process. This helps streamline the development workflow.

- **Simplicity and Minimalism**

  Flask follows the principle of simplicity and minimalism. It provides the essentials for building web applications without imposing too much structure. This makes it easy to learn and quick to get started with.

- **Flexibility**

  Flask is unopinionated, allowing developers to choose the tools and libraries they want to use. This flexibility is advantageous for projects with specific requirements or when integrating with different technologies.

- **Extensibility**

  Flask is designed to be easily extensible. It allows developers to add new features through extensions, which are reusable components that integrate seamlessly with Flask applications.

- **Large and Active Community**

  Flask has a large and active community of developers. This means there are plenty of resources, tutorials, and extensions available, making it easier for developers to find help and solutions to common problems.

Limitations of Flask –

- **Opinionated Minimalism** can lead to more decisions left to the developer, which may not be suitable for larger teams or projects with strict conventions.
- **Limited Functionality for Large-scale Applications** often considered a micro-framework, and while it is suitable for small to medium-sized applications, it may lack some features needed for very large and complex projects.
- **Lack of Built-in Database Support** developers need to choose and integrate their preferred database solution.
- **Project structure and scalability** organizing larger projects can be challenging, and developers need to define their own conventions.
- **No built-in ORM** while SQL Alchemy is often used with Flask for database interactions, developers need to set it up separately.
- **Security considerations** provides some security features, developers and ensure that they handle aspects like input validation, secure session management.

Features of Flask –

- Built-in development server, fast debugger
- Integrated support for unit testing
- Support for secure cookies
- ORM support
- RESTful support
- HTTP request handling

CHAPTER NO 2

LITERATURE SURVEY

CHAPTER 2

LITERATURE SURVEY

2.1 LITERATURE SURVEY

[1] Detection of skin diseases using image processing techniques » International Research Journal of Engineering and Technology (IRJET) Volume: 07 Issue: June 6, 2020. Presents an automated method for diagnosing melanoma, practically using a series of thermoscopic images. The resulting topographies are based on a grayscale co-occurrence matrix (GLCM) and the use of a multilayer perceptron classifier (MLP) to classify melanocytic nevi and malignant melanomas. The first approach, "Automatic Iteration Counter," is faster, but the second, "Standard Iteration Counter," provides better accuracy, which is 100% for the training set and 92% for the test set. This will be the subject of research will design and study a system that brings together the results of previous images of pigmented skin lesions (PSL), their analysis, relevant observations and hypotheses from medical experts using a prototyping methodology. [2] "Hybrid Deep Learning for Detecting Lung Disease Using Ultrasound" 2021 IJRAR March 2021, Volume 8, Issue 1 This article attempts to explore deep learning techniques for computational analysis of lung ultrasound images, which offer a promising avenue in screening and Diagnosis of lung diseases. . Recent advances in deep learning support the identification and classification of lung diseases in medical images. [3] Detection of skin diseases based on the image Processing Technology » International Research Journal of Engineering and Technology (IRJET) Volume: 07 Issue: The article presents a practical method for the automatic diagnosis of melanoma using a series of thermoscopic images. The extracted topographies are based on a grayscale co-occurrence matrix (GLCM) and use a multi-layer perceptron classifier. June 6, 2020. By harnessing the power of machine learning algorithms, particularly those in the field of computer science known as machine learning, we strive to assign accurate class labels to data in a problem

domain. Throughout the project, we use popular Python libraries such as Tensor Flow, Keras and NumPy to increase prediction accuracy. [4] The results of this study provide valuable information for the prediction of lung disease using X-rays and enable potential advances in diagnostic and prognostic methods. Artificial Intelligence Disease Prediction System » International Research Journal of Engineering and Technology (IRJET) Volume: 10 Issue: June 6, 2023 This research paper works with archived medical data expressed as descriptions of possible diseases. Given the breadth of the clinical field, the number of hypotheses contained in the information varies from several to several thousand. [5] Skin Disease Detection Using Machine Learning » 2023 IJCRT Volume 11, Issue 5, May 2023ISSN: 2320-2882 This research paper proposes a system for dissection of skin diseases using color images without requiring the intervention of a doctor. The system consists of two stages: the first is to detect infected skin using color, average clustering and color gradient image processing techniques to identify diseased skin, and the second is to detect the type of disease using artificial neural networks to classify. The system was tested on six types of skin diseases with an average accuracy of 95.99% and the second phase 94.016%. [6] "Deep Learning Based Skin Disease Detection" International Journal of Scientific Research in Science, Engineering and Technology (IJSRSET) In this research paper, we study how these people work based on a network model structure based on Deep Neural Fusion (CNN) developed skin diseases. DenseNet201 and also photos clinical information forms the input for this interbinary classifier, which is used to diagnose local features. Images 2023, 12, 4383 of 19. Only the interim display sample achieved a reliability and sensitivity of 95.1% and 83.5% respectively. [7] Allogenic et al. developed a series of coneural algorithms for the detection of basal cell carcinoma. "Heart Disease Predictive Analytics" 2022 IJCRT Volume 10, Issue 10, October 2022 Several works have been carried out on disease prediction systems using various machine learning algorithms and data mining techniques. KPolaraju et al. proposed the prediction of heart disease using multiple regression model, showing that the MLR model is suitable for predicting heart disease.

The work is performed using a training set consisting of multiple instances with specific attributes in question. According to the results obtained, the accuracy of the classification regression algorithm is the best compared to other algorithms. Marjia et al. developed the prediction of heart disease. [8] "Predicting diabetic diseases using machine learning algorithms" 2022IJCRT Volume 10, Number 6, June 2022 ISSN: 2320-2882 Covers diabetic disease prediction using SVM, ANN, decision tree, LR and random forest classifiers.

Various Machine Learning algorithms like Logistic Regression, Support Vector Machine, Naïve Bayes, Multi-Layer Perceptron, k-nearest neighbours, Decision Tree, Random Forest are used for prediction of diabetes and hypertension. The results obtained after a comparative study, showed that Logistic Regression obtained high accuracy of 83.16% on diabetes dataset.

2.2 FINDINGS

Table 1: Analysis of existing models

Authors And Citation	Methods	Advantages	Challenges
Sunpreet Bhatiya et al. [9]	AlexNet	This approach potentially enables quicker and more cost-effective diagnosis.	Prevalence of skin diseases can vary based on factors like genetics and environmental factors.
M. Rupadevi et al. [10]	RFC	contributing to more effective and reliable diagnoses.	Retinal characteristics can vary among individuals.
Rohan Darji et al. [11]	VGG-19	The achievement of fast classification rates aligns with the primary objective.	The ongoing challenge of optimizing model training for scalability and accessibility in diverse healthcare.
Tanmay Ture et al. [12]	DenseNet	achieving high accuracy in predicting multiple diseases.	compatibility with evolving technological standards.
Divya Mandem et al. [13]	CNN	emphasizing the need for ongoing technical support and development.	Potentially offering scalability and efficient management of the application.

2.3 RELATED/EXISTING WORK

Ada Health

Operation: Ada Health is an AI-driven mobile app that uses a symptom-checker algorithm to assess user-reported symptoms. Users input information about their health condition, and the app provides possible explanations, potential causes, and recommended actions.

Function: Ada Health aims to assist users in self-assessing their health by analyzing reported symptoms. The app provides personalized health information and advice, helping users make informed decisions about seeking medical attention.

Application: Ada Health can be used for a preliminary assessment of various health conditions, guiding users on whether to consult a healthcare professional. It facilitates health literacy and empowers users to understand their symptoms better.

Limitation: Ada Health is not a substitute for professional medical advice. Its assessments are based on user-provided information and may not consider all aspects of a person's health. Users should consult healthcare professionals for accurate diagnoses.

Symptomate

Operation: Symptomate is a mobile app that uses an advanced algorithm to assess reported symptoms and provide potential diagnoses. Users input details about their health, and the app offers information on likely conditions, severity, and urgency of medical attention.

Function: Symptomate aims to assist users in self-diagnosing common medical conditions based on symptom analysis. It provides educational content and suggestions for next steps, including whether to consult a healthcare professional.

Application: Symptomate is suitable for users looking to understand the possible causes of their symptoms. It serves as an informational tool to guide users in making decisions about seeking medical advice or managing their health.

Limitations: Symptomate's assessments are based on algorithms and user-provided data, making it important for users to validate results with healthcare professionals for accurate diagnoses and treatment plan.

2.4 REAL-TIME SURVEY

Prescriptions that can be suggested by the clinical experts –

- They give some suggestions and ask them how to prevent these diseases, so they suggest some tests and give some prescriptions about diseases.
- In those prescriptions, they write some of the medicines and test names to prevent these diseases; they also tell how the patients can be infected by these diseases.

Early Disease Detection–

- Early detection of diseases such as cancer, diabetes, and cardiovascular diseases is essential for timely intervention.
- Multi-disease diagnosis can improve the chances of early detection, leading to better treatment outcomes.

Reducing Misdiagnosis –

- Misdiagnosis can lead to serious consequences for patients.
- Advanced diagnostic tools can help reduce the risk of misdiagnosis by providing more accurate and reliable results.

Efficient Resource Allocation –

- Hospitals often face resource constraints, including healthcare professionals' time and medical equipment.
- Multi-disease diagnosis can help allocate resources more efficiently by prioritizing patients with the greatest need.

Personalized Treatment –

- Deep learning algorithms can analyze patient data to provide personalized treatment recommendations, taking into account individual factors such as genetics, lifestyle, and medical history.

CHAPTER NO 3

METHODOLOGY / PROPOSED WORK

CHAPTER 3

METHODOLOGY / PROPOSED WORK

3.1 PROPOSED WORK

1. Proposed Modules/ Steps:

Modules

1. Download the Datasets and Extract Them.
2. Defining the Directories in Dataset.
3. Define the Model.
4. Data Pre-processing.
5. Training the Model.
6. Running the Model.
7. Creating a Web Application.
8. Deployment.

2. Proposed Modules/ Steps:

- We use CNN architecture to train to find out different types of disease with the help of image datasets.
- We also find out diseases with the help of CSV files.
- We build web application to upload images, and data and predict the expected output.

3.2 SYSTEM ARCHITECTURE

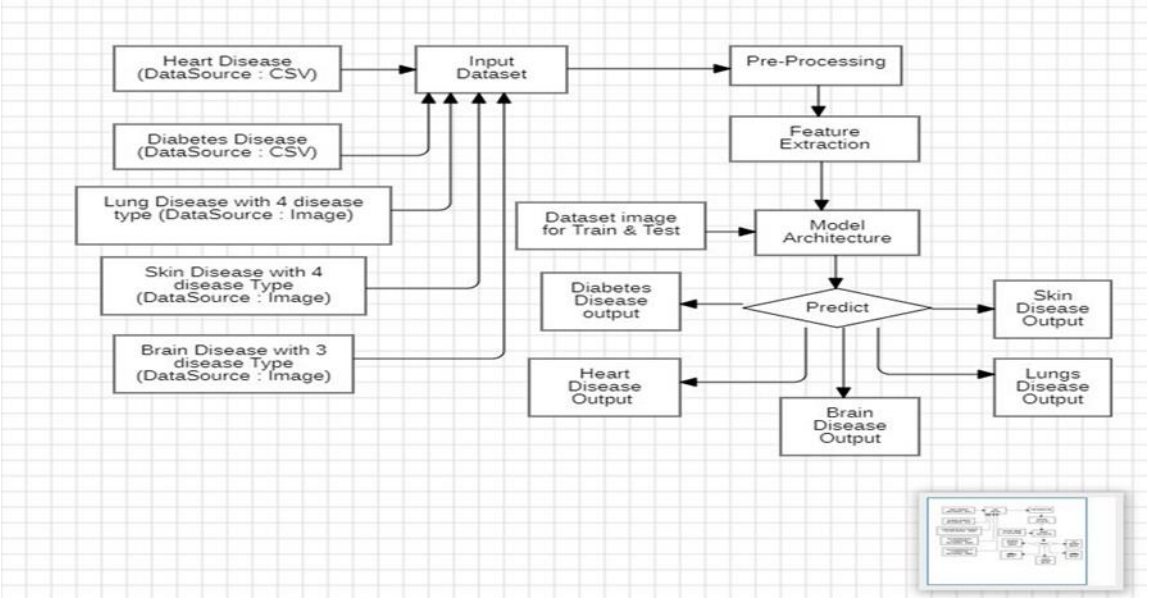


Fig 3.2 System Architecture

The architecture in the image is a block diagram of a medical diagnosis system that uses machine learning and deep learning to predict five diseases: lung disease, skin disease, brain disease, diabetes, and heart disease. The system takes two types of inputs: images for lung disease, skin disease, and brain disease; and CSV files for diabetes and heart disease. The system consists of three main components:

Data preprocessing: This component preprocesses the input data to make it suitable for machine learning. For the images, this may involve noise reduction, normalization, and augmentation. For the CSV files, this may involve handling missing values, outliers, and inconsistencies.

Feature extraction: This component extracts relevant features from the preprocessed data. For the images, this may involve extracting textures, shapes, and patterns. For the CSV files, this may involve extracting statistical features from the data.

Model prediction: This component uses the extracted features to predict the likelihood of each of the five diseases. For the lung, skin, and brain diseases, deep learning models are used. For diabetes and heart disease, machine learning models are used.

The system is trained on a dataset of labeled data, where each data point is labeled with the presence or absence of each of the five diseases. Once the system is trained, it can be used to predict the diseases on new, unseen data.

3.3 ALGORITHM/PSEUDO CODE/PROCEDURE

Step 1: Data Collection:

- Collect X-ray, MRI and images for lung disease, skin disease and brain disease.
- Collect CSV files containing patient information for diabetes and heart disease.

Step 2: Data Preprocessing:

- For images: Apply image processing techniques like noise reduction, normalization, and augmentation. Extract relevant features like textures, shapes, and patterns.
- For CSV files: Clean and pre-process data by handling missing values, outliers, and inconsistencies.

Step 3: Model Selection:

- For images: Use deep learning models like Convolutional Neural Networks (CNNs) to learn complex features from image data.
- For CSV files: Use machine learning models like random forests for classification tasks.

Step 4: Model Training:

- Divide the preprocessed data into training, validation, and test sets.
- Train the selected models on the training set using appropriate algorithms and hyperparameter tuning.
- Monitor performance on the validation set to prevent overfitting and optimize model parameters.

Step 5: Model Evaluation:

- Evaluate the trained models on the test set using metrics like accuracy, precision, recall, and F1 score for classification tasks.
- Compare the performance of different models and choose the best performing model for prediction.

Step 6: Model Deployment:

- Integrate the chosen model into a web application for real-world use.
- Provide an interface for users to upload images or CSV files and receive disease prediction results.

Step 7: Monitoring and Improvement:

- Continuously monitor the model performance in real-world scenarios.
- Collect feedback from users and experts.
- Retrain the model with new data and improved techniques to maintain high performance and adapt to evolving disease patterns.

3.4 FLOW CHART

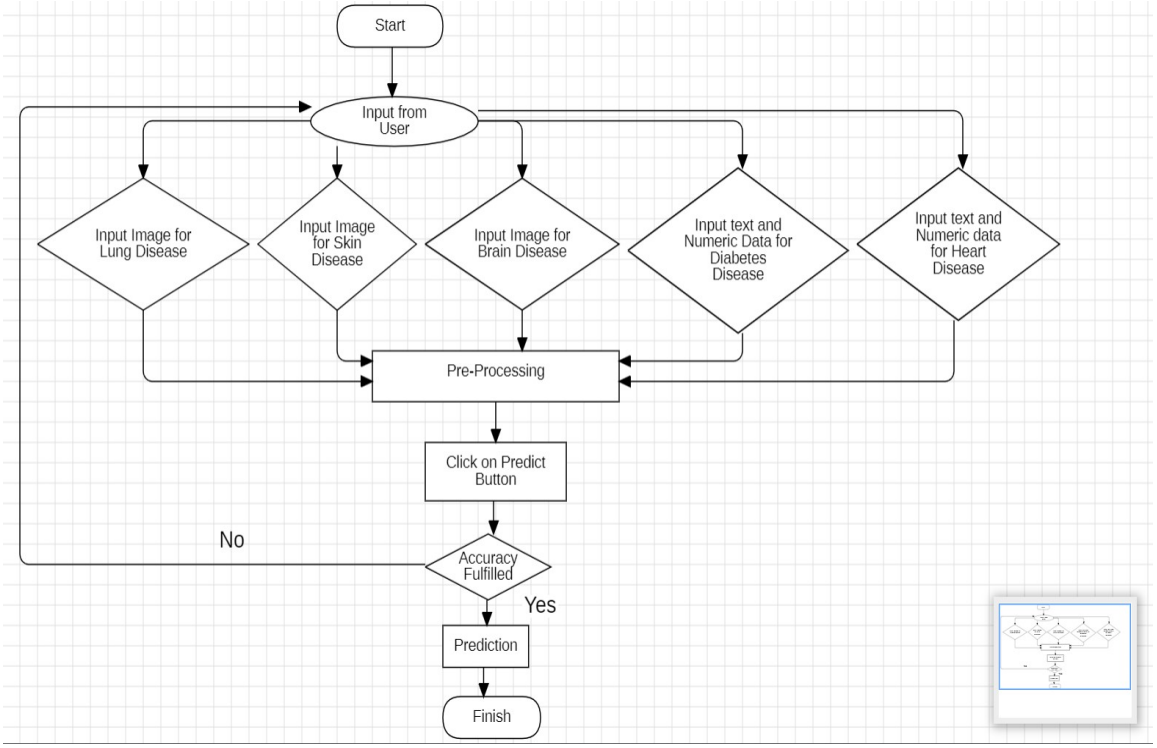


Fig 3.3 Flow Chart

The first step in the process is data preprocessing, which involves cleaning and transforming the data to make it suitable for machine learning. For the images, this may involve noise reduction, normalization, and augmentation. For the CSV files, this may involve handling missing values, outliers, and inconsistencies.

Once the data is preprocessed, it is fed into the machine learning and deep learning models. The deep learning models are used to extract features from the images, while the machine learning models are used to build classification models to predict the diseases. After the models are trained, they are evaluated on a held-out test set to assess their performance. If the performance is satisfactory, the models are deployed to production. In production, users can upload images or CSV files to the system to receive disease predictions. The system will first preprocess the data and then feed it into the trained models. The models will then output predictions for each of the five diseases.

CHAPTER NO 4

TOOLS/PLATFORM

CHAPTER 4

Tools/Platform

4.1 SOFTWARE REQUIREMENT

1. **OS** – Windows 10
2. **Modelling and Implementation tool** – Anaconda (Conda) -3.2.1
3. **IDE** – Visual Studio-1.85, Spyder-0.3.0, Google Colab-LTS
4. **Library** – Scikit- Learn, NumPy, Matplotlib-3.8.2, TensorFlow2.14.0 and Keras
5. **Language** – Python-3.2, HTML-5, CSS-3 and JavaScript
6. **Designing tool** – StarUML-6.0.1

1. OPERATING SYSTEM –

Any Operating System which is having architecture of 32bit or higher is supported. We have used Windows 10 64bit with NVIDIA GPU.

2. Modelling and Implementation tool

ANACONDA –

Anaconda is a distribution of the Python and R programming languages for scientific computing (data science, machine learning applications, large-scale data processing, predictive analytics, etc.), that aims to simplify package management and deployment. The distribution includes data-science packages suitable for Windows, Linux, and macOS. It is developed and maintained by Anaconda, Inc., which was founded by Peter Wang and Travis Oliphant in 2012. Conda is commonly used for installing, updating, and managing packages and libraries in various programming languages, with a primary focus on Python packages. It simplifies the process of fetching, distributing, and managing libraries and dependencies. Conda allows you to create isolated environments for your projects. Each environment can have its own set of packages and dependencies, which helps avoid conflicts between different projects with different requirements.

Features of Anaconda –

- **Package Management**
  Anaconda includes a package manager called Conda, which simplifies the process of installing, updating, and managing packages and dependencies.
- **Environment Management**

  Conda also allows users to create and manage isolated environments, making it easy to work on different projects with specific package dependencies.
- **Cross - Platform**
  Anaconda is available for Windows, macOS, and Linux, making it a versatile choice for users on different operating systems.
- **Community Support**
  Anaconda has a large and active community, which means access to a wealth of resources, tutorials, and forums for assistance.
- **Jupyter Notebooks**
  Anaconda includes the Jupyter Notebook, a powerful interactive web application for creating and sharing documents that contain live code, equations, visualizations, and narrative text.
- **Machine Learning**
  Anaconda includes popular machine learning frameworks and libraries such as scikit-learn, TensorFlow, and PyTorch, enabling users to work on machine learning projects seamlessly.

Advantages of Anaconda –

- **Easy Installation**

  Anaconda offers a straightforward installation process, reducing the complexity of setting up a data science environment. This is particularly beneficial for users, including beginners, who want to get started quickly.

- **Integrated Development Environment (IDE)**

  While not an IDE itself, Anaconda Navigator provides a user-friendly interface for managing environments and launching applications, including IDEs like Spyder. This simplifies the development workflow for users.

- **Comprehensive Data Science Libraries**

  Anaconda includes a wide range of pre-installed data science libraries and tools such as NumPy, Pandas, Matplotlib, scikit-learn, TensorFlow and more.

- **Environment Management**

  Conda enables the creation and management of isolated environments. This allows users to work on multiple projects with different library versions and dependencies without conflicts.

- **Package Management with Conda**

  Anaconda comes with Conda, a powerful package manager that simplifies the installation, updating, and management of software packages and dependencies. This helps avoid compatibility issues and make it easy to set up environments for different projects.

- **Versatility**

  Anaconda is not limited to data science; it supports a broad range of applications, from scientific computing to machine learning, making it versatile for various domains.

Limitations of Anaconda –

- **Resource Usage** some users find that Anaconda can be resource-intensive, consuming a significant amount of disk space and memory. This might be a concern for systems with limited resources.
- **Size** anaconda distribution can be relatively large to download and install, especially for users with limited bandwidth or storage space. This can be a consideration for environments with restricted resources.
- **Updates and Maintenance** anaconda simplifies package management, updates, and maintenance, users might encounter occasional issues during updates. It's crucial to be aware of potential conflicts or unexpected behaviors that may arise when updating packages.
- **Limited IDE Choices** anaconda includes the Spyder IDE and supports Jupiter Notebooks, users who prefer other IDEs may need to install then separately. This can be a limitation for those who have a strong preference for a different development environment.

3. IDE

Visual Studio –

Visual Studio is an Integrated Development Environment (IDE) developed by Microsoft. Visual Studio supports various programming languages, including C#, C++, Visual Basic, Python and more.

Visual Studio provides a powerful code editor with features like syntax highlighting, IntelliSense and code navigation. This enhances productivity and helps catch errors early in the development process.

Visual Studio includes built-in Git integration, making it easier for developers to manage version control and collaborate on projects using Git repositories. It is highly extensible, allowing developers to customize and enhance their development environment with extensions and plugins.

Spyder –

Spyder is an open-source Integrated Development Environment (IDE) for the Python programming language. It provides an interactive Python console within the IDE, allowing users to execute Python code line by line, similar to the Python REPL (Read-Eval-Print Loop).

Spyder integrates IPython, an enhanced interactive Python shell, providing additional features such as improved introspection, rich media output, and a more powerful REPL experience. It includes a dedicated window for plotting and visualizing data using Matplotlib. Users can create, view, and interact with plots directly within the IDE.

In addition to standard variables, Spyder's variable explorer is particularly useful for working with Pandas Data Frames. It provides a tabular view to Data Frame data and allows users to manipulate and explore the data easily.

Google Colab –

Collaboratory (also known as Colab) is a free Jupyter notebook environment that runs in the cloud and stores its notebooks on Google Drive. Colab was originally an internal Google project; an attempt was made to open source all the code and work more directly upstream, leading to the development of the "Open in Colab" Google Chrome extension, but this eventually ended, and Colab development continued internally.

Colab notebooks are similar to Jupyter notebooks and can be shared and edited by multiple users in real-time. The platform also offers integration with Google Drive, making it easy and share your work.

Its particularly popular for machine learning and data analysis tasks, as it provides access to GPUs (Graphics Processing Units) for accelerated computation.

4. Library

Scikit Learn –

Scikit-learn is probably the most useful library for machine learning in Python. The sklearn library contains a lot of efficient tools for machine learning and statistical modeling including classification, regression, clustering, and dimensionality reduction. Please note that sklearn is used to build machine learning models. It should not be used for reading the data, manipulating and summarizing it.

NumPy –

Scikit NumPy is a Python library used for working with arrays. It also has functions for working in the domain of linear algebra, Fourier transform, and matrices. NumPy wascreated in 2005 by Travis Oliphant. It is an open-source project and you can use it freely. NumPy stands for Numerical Python.

Matplotlib –

Matplotlib is one of the most popular Python packages used for data visualization. It is a cross-platform library for making 2D plots from data in arrays. Matplotlib is written in Python and makes use of NumPy, the numerical mathematics extension of Python. It provides an object-oriented API that helps in embedding plots in applications using Python GUI toolkits such as PyQt, and WxPythonotTkinter. It can be used in Python and IPython shells, Jupyter Notebook, and web application servers.

TensorFlow –

TensorFlow is a software library or framework, designed by the Google team to implement machine learning and deep learning concepts in the easiest manner. It combines the computational algebra of optimization techniques for easy calculation of many mathematical expressions. TensorFlow is well-documented and includes plenty of machine learning libraries. It offers a few

important functionalities and methods for the same. TensorFlow is also called a "Google" product. It includes a variety of machine learning and deep learning algorithms. TensorFlow can train and run deep neural networks for handwritten digit classification, image recognition, word embedding, and the creation of various sequence models.

Keras –

Keras is an open-source deep-learning library written in Python. It is designed to be user-friendly, modular, and extensible, making it a popular choice for developing and prototyping artificial neural networks, particularly deep neural networks for machine learning tasks. Keras is a popular choice for both beginners and experienced machine learning practitioners due to its ease of use, flexibility, and extensive capabilities.

5. Language

Python –

Python is a general purpose interpreted, interactive, object-oriented, and high-level programming language. Like Perl, Python source code is also available under the GNU General Public License (GPL). Python is dynamically typed and garbage collected. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming.

HTML –

HTML (Hyper Text Markup Language), it is used to design web pages using markup language. It defines the link between the web pages. A Markup Language is used to define the text document within the tag which defines the structure of web pages.

CSS –

Cascading Style Sheets (CSS) is a style sheet language used in web development to control the presentation and styling of web documents, including HTML and XML documents. CSS is an integral part of web development that

allows you to control the visual presentation and styling of web content. It enables the separation of concerns between content and presentation, making it easier to create aesthetically pleasing and responsive web pages.

JavaScript –

JavaScript is a high-level, versatile, and widely used programming language that is primarily known for its role in web development. It allows developers to add interactivity, manipulate the Document Object Model (DOM), and create dynamic content on websites. JavaScript is a foundational technology for modern web development and continues to play a crucial role in building dynamic and interactive web applications.

6. Designing Tool

StarUML –

StarUML is a software engineering tool for system modeling using the Modeling Language, as well as systems Modeling Language, and classical modeling notations. It is published by MKLabs and is available on Windows, Linux, and MacOS. You can export diagrams created in StarUML in various formats, such as image files, and PDFs or directly share them with team members through collaborative tools or version control systems. It integrates with version control systems like Git, facilitating team collaboration and version management of your models.

4.2 HARDWARE REQUIREMENT

CPU: At least 4 cores of processor

Hardware: Monitor, Keyboard, Mouse

GPU: At least 4GB of VRAM

RAM: At least 16GB of RAM

INTERNET CONNECTION: Fast Internet Connection is essential

STORAGE: At least 256GB of SSD

CHAPTER NO 5

DESIGN & IMPLEMENTATION

CHAPTER 5

DESIGN & IMPLEMENTATION

5.1 SYSTEM DESIGN

5.1.1 USE-CASE DIAGRAM

Actors –

1. User
2. System

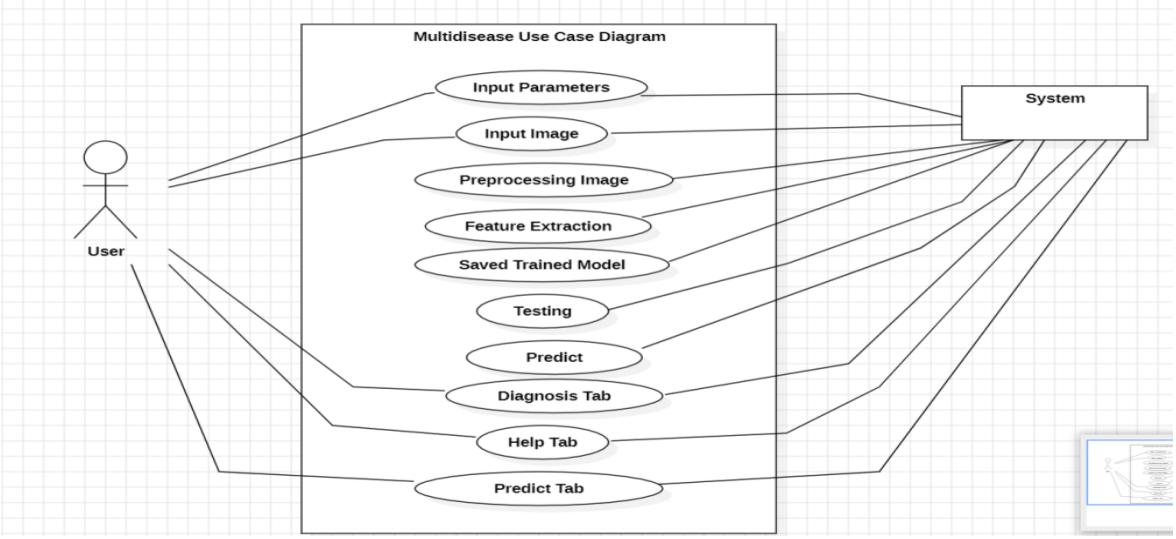


Fig. - 5.1.1: Use-Case Diagram

The user can input an image of any such as X-ray, MRI, or CT scan or input parameters. The system will then preprocess the image and extract features from it. These features will then be used to test the image against a trained model to predict the disease(s) that the patient may have. The predicted disease(s) will then be displayed in the Diagnosis Tab (if any).

The system may also provide help information to the user, such as information about the predicted disease(s) or how to interpret the results.

5.1.2. CLASS DIAGRAM

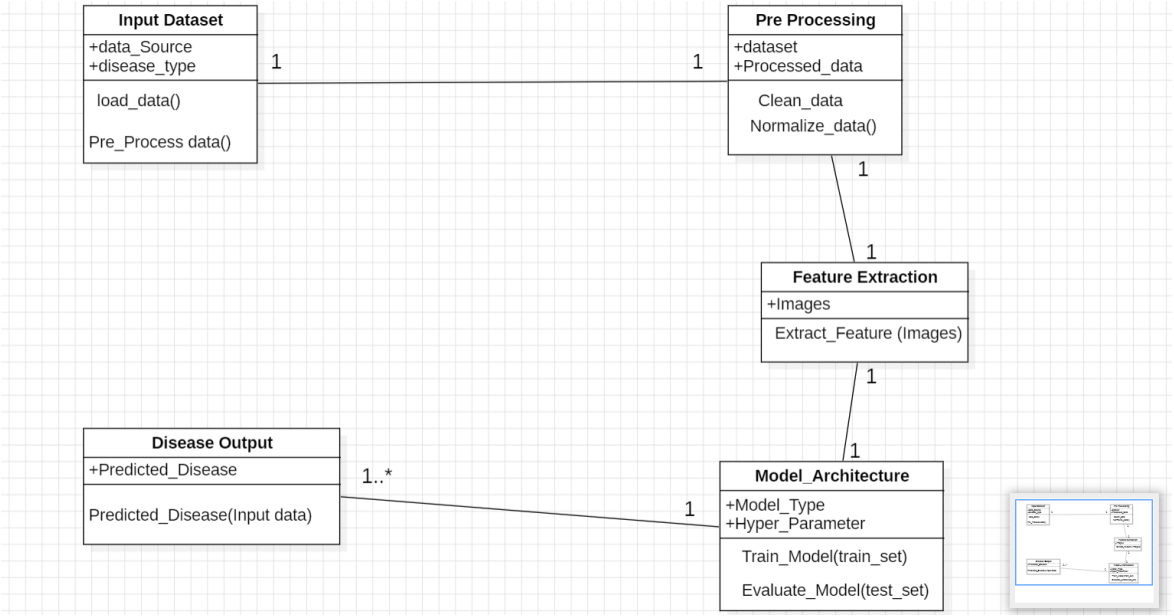


Fig. - 5.1.2: Class Diagram

The class diagram shows the following classes:

- User: This class represents the user of the system.
- Normalize: This class is responsible for normalizing the input data.
- Machine Learning Deep Learning Model: This class represents the machine learning model that is used to predict the diseases.
- Training Model: This class represents the training model that is used to train the machine learning model which is train on given dataset.
- Disease Classification: This class represents prediction of Diseases.

The classes in the class diagram interact with each other in the following way:

1. The User class inputs the image and text data.
2. The Normalize class normalizes the input data.
3. The Machine Learning Deep Learning Model class uses the normalized input data to predict the diseases.
4. The Training Model class is used to train the Machine Learning Deep Learning Model class on given Dataset.
5. The Disease Classification class give prediction of disease based on input data.

5.1.3 SEQUENCE DIAGRAM

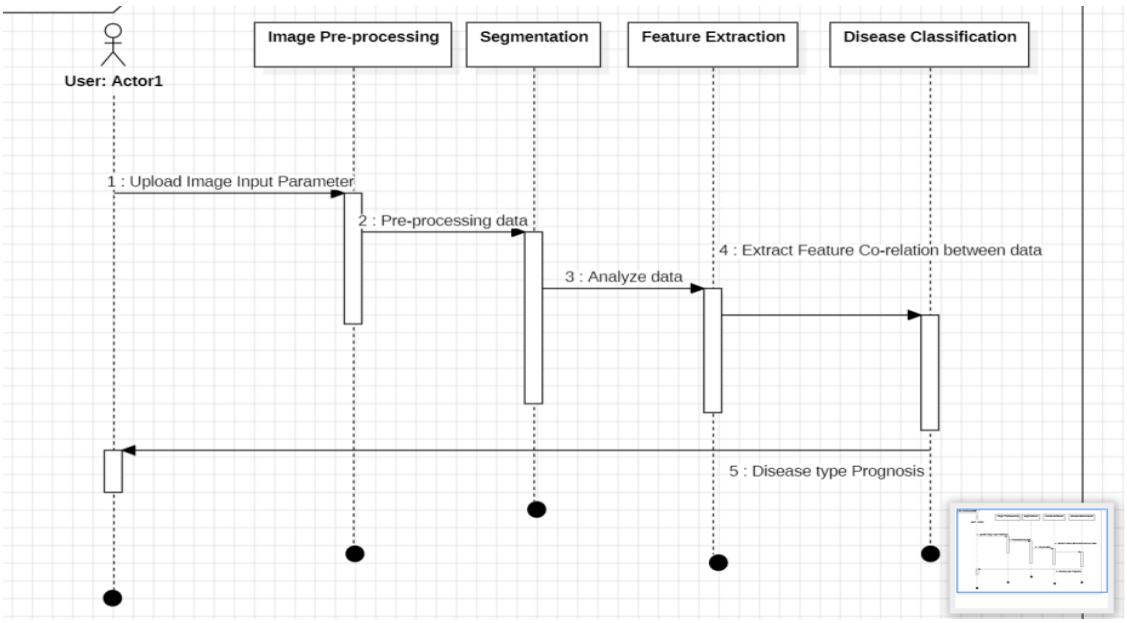


Fig. - 5.1.3: Sequence Diagram

1. The user uploads an image of the medical scan. The image can be in any format, such as JPEG, PNG, or TIFF.
2. The system preprocesses the image to improve the accuracy of the prediction. This may involve resizing the image, cropping the image, or converting the image to grayscale.
3. The system extracts feature from the image. These features are characteristics of the image that are relevant to predicting the disease(s).
4. The system feeds the extracted features to a trained machine learning model to predict the disease(s). The trained machine learning model was trained on a large dataset of medical images and disease labels.
5. The system displays the predicted disease(s) to the user. The predicted disease(s) may be displayed in a list, along with the probability of each disease.

5.2 Implementation of System

5.2.1 Completed Modules

1. Module 1 – Choose Dataset:

- It is very important to choose the connect, valid and relevant dataset before training the model.
- After choosing the dataset, it's important to make it meaningful. All the datasets are not 100% complete and meaningful.
- After making the data meaningful and 100% complete then model can be trained.

2. Module 2 – Choose Algorithm:

- There are more than 100 algorithms available for training a deep learning and Machine Learning model.
- Choosing a useful, highly perfect and efficient algorithm is important.
- VGG, CNN with Densenet Architecture, CNN with Resnet Architecture, Random Forest all these algorithms used in our project.

3. Module 3 – Train Model:

- After choosing algorithm, dataset, we started with train our Machine Learning and Deep Learning model.
- All the Deep Learning models are trained for 100 epochs. The models are trained successfully.

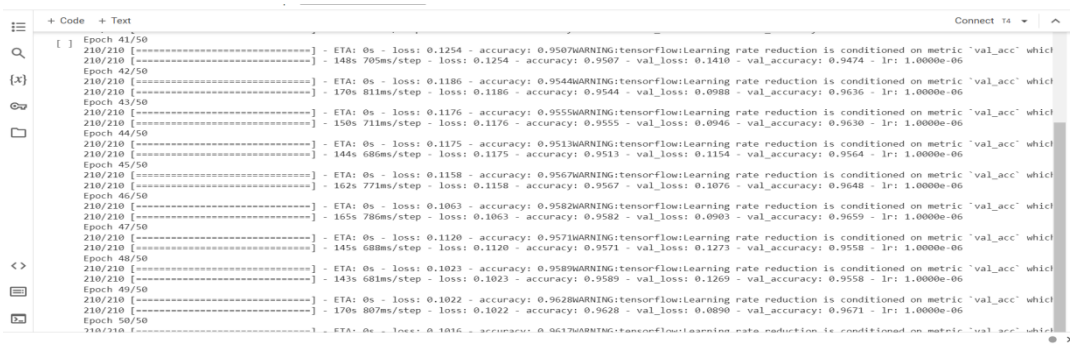


Fig. – 5.2.1: Model Training

4. Module 4 – Choose Web Framework:

- It is important to select fast lightweight efficient and optimal web framework.
- As we are already working with heavy models and their frameworks/ to libraries. So we selected to work with flask.
- Flask is a python web framework used to develop lightweight and small web applications.

5. Module 5 – Start working on Web App:

- After selecting Web Framework, we started developing our Web Applications.

Fig. – 5.2.2: Result page

6. Module 6 – Start Testing:

- After development and training of models, we had started with testing our Web App.
- After test the models, it is concluded that models are perfectly reached the accuracy of 90% +.

```
from flask import Flask, render_template, request, flash, url_for
import numpy as np
import os
import pandas as pd
from tensorflow.keras.utils import load_img
from tensorflow.keras.utils import img_to_array
from keras.models import load_model
from sklearn.ensemble import RandomForestClassifier
import joblib
import pickle
import sklearn
uploadedimges="static/userUpload"
result="result.html"
healthy_heart="static/assest/Healthy_heart.jpg"
unhealtht_heart="static/assest/Unhealthy_heart.jpg"
#-----------------------------------------------------------------------------

#----------------------------------loading models-------------------------------
heart_model=pickle.load(open("models\Heart_Disease.pkl", "rb"))
diabetes_model=pickle.load(open("models\Diabetes_disease.pkl", "rb"))
lungs_model=load_model("models\Lungs_disease.h5")
skin_model=load_model("models\Skin_disease4.h5")
brain_model=load_model("models/brain_disease.h5")
print("models loaded")
#-----------------------------------------------------------------------------
def brain_models_prediction(brain_Images):
    test_image=load_img(brain_Images, target_size=(224, 224))
    test_image = img_to_array(test_image)/255 # convert image to np array and normalize
    test_image = np.expand_dims(test_image, axis = 0) # change dimention 3D to 4D

    result = brain_model.predict(test_image).round(3) # predict diseased palnt or not
    print('@@ Raw result = ', result)
    pred=np.argmax(result)
    if pred == 0:
        print("GLIOMA")
        data={
        "disease":"Glioma Brain Disease",
        "abstraction":"Glioma is a type of tumor that originates from glial cells, which are
someone you know may have glioma, it is important to see a doctor for diagnosis and treatment
```

Fig. – 5.2.3: Flask app

5.3 Sample Code

```
from flask import Flask, render template, request, flash, url_for
import numpy as np
import os
import pandas as pd
from tensorflow.keras.utils import load_img
from tensorflow.keras.utils import img_to_array
from keras.models import load_model
from sklearn.ensemble import RandomForestClassifier
import joblib
import pickle
import sklearn
uploadedimges="static/userUpload"
result="result.html"
healthy_heart="static/assest/Healthy_heart.jpg"
unhealtht_heart="static/assest/Unhealthy_heart.jpg"
#-------------------------------loading models----------------------------
heart_model=pickle.load(open("models\Heart_Disease.pkl", "rb"))
diabetes_model=pickle.load(open("models\Diabetes_disease.pkl", "rb"))
lungs_model=load_model("models\Lungs_disease.h5")
skin_model=load_model("models\Skin_disease4.h5")
brain_model=load_model("models/brain_disease.h5")
print("models loaded")
#-------------------------------------------------------------------------
def brain_models_prediction(brain_Images):
    test_image=load_img(brain_Images, target_size=(224, 224))
    test_image = img_to_array(test_image)/255
```

```
 test_image = np.expand_dims(test_image, axis = 0) # change dimention 3D to 4D
result = brain_model.predict(test_image).round(3) # predict diseased palnt or not
 print('@@ Raw result = ', result)
 pred=np.argmax(result)
 if pred == 0:
    print("GLIOMA")
    data={
    "disease":"Glioma Brain Disease",
    "abstraction":"Glioma is a type of tumor that originates from glial cells.",
    "symptoms_define":"The symptoms of meningioma depend on the location and    size
      of the tumor. Some common symptoms include:",
    "symptoms_list":"<li>Headaches</li><li>Seizures</li><li>Vision problems</li>",
    "treatment":"Treatment options for meningioma depend.</li>"
 }
  return data
 elif pred==2:
    print("NO TUMOR")
    data={
    "disease":"Healthy Brain",
    "abstraction":"Atopic dermatitis(Eczema) is a condition that causes dry.",
    "symptoms_define":"In infants, the itchy rash can lead to an oozing, crusting
     condition, mainly on the face and scalp.",
    "symptoms_list":"<li>Dry, cracked skin</li>",
    "treatment":"<li>Moisturize your skin at least twice a day</li><li>Take a daily bath or
     Shower</li><li>Use a gentle, nonsoap cleaner</li>"
 }
  return data
```

```
def lungs_models_prediction(lungs_Images):
test_image=load_img(lungs_Images, target_size=(224, 224))
test_image = img_to_array(test_image)/255 # convert image to np array and normalize
test_image = np.expand_dims(test_image, axis = 0) # change dimention 3D to 4D


result = lungs_model.predict(test_image).round(3)
print('@@ Raw result = ', result)
pred=np.argmax(result)
if pred == 0:
  data={
     "disease":"Bacterial Pneumonia",
    "abstraction":"Hormonal imbalances, especially in androgens.",
     "symptoms_define":"Acne, also known as acne vulgaris.",
     "symptoms_list":"<li><strong>Comedones:</strong> These are non-
      inflammatory.</li>",
     "treatment":"The goal of acne treatment is to reduce oil production</li>"
  }
  return data
  elif pred==1:
  print("normal")
  data={
     "disease":"Normal",
     "abstraction":"Hormonal imbalances, especially in androgens, can contribute to
acne. Testing hormone levels, particularly in cases of adult-onset acne or in females with
signs of hormonal imbalance, may be considered.Skin Biopsy: In rare cases, a skin biopsy
may be performed to examine a small piece of skin under a microscope. This can help
confirm the diagnosis and rule out other skin conditions. Patch Testing: Patch testing may
be done to identify any allergic reactions to topical medications or skincare products, which
could exacerbate or contribute to acne. Comedone Extraction: Dermatologists may perform
comedone extraction to remove blackheads and whiteheads. This is a manual extraction
```

process that should be done by a trained professional. Imaging Techniques: Imaging techniques such as ultrasound or high-frequency ultrasound may be used to assess the depth and severity of acne lesions.",

"symptoms_define":"Acne, also known as acne vulgaris, is a common skin condition that occurs when hair follicles become plugged with dead skin cells and oil (sebum). This can lead to the formation of various lesions, including blackheads, whiteheads, papules, pustules, nodules, and cysts. Acne typically affects the face, back, chest, and shoulders, and it is most common during adolescence, although it can occur at any age.",

"symptoms_list":"
Comedones: These are non-inflammatory lesions and can be open (blackheads) or closed (whiteheads).
Papules: Small, red, raised bumps that may be tender to the touch.
Pustules: Pimples filled with pus. They are red at the base and have a white or yellow center.
Nodules: Large, painful, solid lesions located deep within the skin.
Cysts: Deep, painful, pus-filled lumps that can cause scarring.
",

"treatment":"The goal of acne treatment is to reduce oil production, prevent clogged pores, and manage inflammation. Treatment options include:
Topical Treatments:
Benzoyl peroxide: Kills bacteria and removes excess oil. Retinoids: Unclog pores and promote the exfoliation of dead skin cells. Topical antibiotics: Reduce bacteria on the skin.
Oral

medications: Antibiotics: Oral antibiotics may be prescribed for moderate to severe acne to reduce inflammation and bacteria. certain oral contraceptives can help regulate hormones and reduce acne. Isotretinoin (Accutane): A powerful oral medication for severe acne. It is usually reserved for cases that haven't responded to other treatments due to potential side effects.
Light and laser therapy: Certain light-based therapies can target bacteria and reduce inflammation.
Chemical peels: Exfoliate the skin, helping to unclog pores and improve the appearance of acne.
"

}

return data

elif pred==2:

print("tuberculosis")

data={

"disease":"Tuberculosis",

"abstraction":"Hormonal imbalances, especially in androgens, can contribute to acne. Testing hormone levels, particularly in cases of adult-onset acne or in females with signs of hormonal imbalance, may be considered.Skin Biopsy: In rare cases, a skin biopsy may be performed to examine a small piece of skin under a microscope. This can help confirm the diagnosis and rule out other skin conditions. Patch Testing: Patch testing may be done to identify any allergic reactions to topical medications or skincare products, which could exacerbate or contribute to acne. Comedone Extraction: Dermatologists may perform comedone extraction to remove blackheads and whiteheads. This is a manual extraction process that should be done by a trained professional. Imaging Techniques: Imaging techniques such as ultrasound or high-frequency ultrasound may be used to assess the depth and severity of acne lesions.",

"symptoms_define":"Acne, also known as acne vulgaris, is a common skin condition that occurs when hair follicles become plugged with dead skin cells and oil (sebum). This can lead to the formation of various lesions, including blackheads, whiteheads, papules, pustules, nodules, and cysts. Acne typically affects the face, back, chest, and shoulders, and it is most common during adolescence, although it can occur at any age.",

"symptoms_list":"
Comedones: These are non-inflammatory lesions and can be open (blackheads) or closed (whiteheads).
Papules: Small, red, raised bumps that may be tender to the touch.
Pustules: Pimples filled with pus. They are red at the base and have a white or yellow center.
Nodules: Large, painful, solid lesions located deep within the skin.
Cysts: Deep, painful, pus-filled lumps that can cause scarring.
",

"treatment":"The goal of acne treatment is to reduce oil production, prevent clogged pores, and manage inflammation. Treatment options include:
Topical Treatments:
Benzoyl peroxide: Kills bacteria and

removes excess oil. Retinoids: Unclog pores and promote the exfoliation of dead skin cells. Topical antibiotics: Reduce bacteria on the skin.
Oral medications: Antibiotics: Oral antibiotics may be

prescribed for moderate to severe acne to reduce inflammation and bacteria. certain oral contraceptives can help regulate hormones and reduce acne. Isotretinoin (Accutane): A powerful oral medication for severe acne. It is usually reserved for cases that haven't responded to other treatments due to potential side effects.
Light and laser therapy: Certain light-based therapies can target bacteria and reduce inflammation.
Chemical peels: Exfoliate the skin, helping to unclog pores and improve the appearance of acne.
"

}

return data

elif pred==3:

print("viral pneumonia")

data={

"disease":"Viral Pneumonia",

"abstraction":"Hormonal imbalances, especially in androgens, can contribute to acne. Testing hormone levels, particularly in cases of adult-onset acne or in females with signs of hormonal imbalance, may be considered.Skin Biopsy: In rare cases, a skin biopsy may be performed to examine a small piece of skin under a microscope. This can help confirm the diagnosis and rule out other skin conditions. Patch Testing: Patch testing may be done to identify any allergic reactions to topical medications or skincare products, which could exacerbate or contribute to acne. Comedone Extraction: Dermatologists may perform comedone extraction to remove blackheads and whiteheads. This is a manual extraction process that should be done by a trained professional. Imaging Techniques: Imaging techniques such as ultrasound or high-frequency ultrasound may be used to assess the depth and severity of acne lesions.",

"symptoms_define":"Acne, also known as acne vulgaris, is a common skin condition that occurs when hair follicles become plugged with dead skin cells and oil (sebum). This

can lead to the formation of various lesions, including blackheads, whiteheads, papules, pustules, nodules, and cysts. Acne typically affects the face, back, chest, and shoulders, and it is most common during adolescence, although it can occur at any age.",

"symptoms_list":"
Comedones: These are non-inflammatory lesions and can be open (blackheads) or closed (whiteheads).
Papules: Small, red, raised bumps that may be tender to the touch.
Pustules: Pimples filled with pus. They are red at the base and have a white or yellow center.
Nodules: Large, painful, solid lesions located deep within the skin.
Cysts: Deep, painful, pus-filled lumps that can cause scarring.
",

"treatment":"The goal of acne treatment is to reduce oil production, prevent clogged pores, and manage inflammation. Treatment options include:
Topical Treatments:
Benzoyl peroxide: Kills bacteria and removes excess oil. Retinoids: Unclog pores and promote the exfoliation of dead skin cells. Topical antibiotics: Reduce bacteria on the skin.
Oral medications: Antibiotics: Oral antibiotics may be

prescribed for moderate to severe acne to reduce inflammation and bacteria. certain oral contraceptives can help regulate hormones and reduce acne. Isotretinoin (Accutane): A powerful oral medication for severe acne. It is usually reserved for cases that haven't responded to other treatments due to potential side effects.
Light and laser therapy: Certain light-based therapies can target bacteria and reduce inflammation.
Chemical peels: Exfoliate the skin, helping to unclog pores and improve the appearance of acne.
"

}

return data

```
#-----------------------------------------------------------------------------------------------------
def skin_models_prediction(skin_Images):
    test_image=load_img(skin_Images, target_size=(224, 224))
    test_image = img_to_array(test_image)/255 # convert image to np array and normalize
```

```
test_image = np.expand_dims(test_image, axis = 0) # change dimention 3D to 4D
result = skin_model.predict(test_image).round(3) # predict diseased palnt or not
print('@@ Raw result = ', result)
pred=np.argmax(result)
if pred == 0:
    print("acne")
    data={
        "disease":"Acne on Skin",
        "abstraction":"Hormonal imbalances, especially in androgens, can contribute to acne. Testing hormone levels, particularly in cases of adult-onset acne or in females with signs of hormonal imbalance, may be considered.Skin Biopsy: In rare cases, a skin biopsy may be performed to examine a small piece of skin under a microscope. This can help confirm the diagnosis and rule out other skin conditions. Patch Testing: Patch testing may be done to identify any allergic reactions to topical medications or skincare products, which could exacerbate or contribute to acne. Comedone Extraction: Dermatologists may perform comedone extraction to remove blackheads and whiteheads. This is a manual extraction process that should be done by a trained professional. Imaging Techniques: Imaging techniques such as ultrasound or high-frequency ultrasound may be used to assess the depth and severity of acne lesions.",
        "symptoms_define":"Acne, also known as acne vulgaris, is a common skin condition that occurs when hair follicles become plugged with dead skin cells and oil (sebum). This can lead to the formation of various lesions, including blackheads, whiteheads, papules,
pustules, nodules, and cysts. Acne typically affects the face, back, chest, and shoulders, and it is most common during adolescence, although it can occur at any age.",
        "symptoms_list":"<li><strong>Comedones:</strong> These are non-inflammatory lesions and can be open (blackheads) or closed (whiteheads).</li><li><strong>Papules:</strong> Small, red, raised bumps that may be tender to the touch.</li><li><strong>Pustules:</strong> Pimples filled with pus. They are red at the base and have a white or yellow center.</li><li><strong>Nodules:</strong>
```

Large, painful, solid lesions located deep within the skin.
Cysts: Deep, painful, pus-filled lumps that can cause scarring.
",

"treatment":"The goal of acne treatment is to reduce oil production, prevent clogged pores, and manage inflammation. Treatment options include:
Topical Treatments:
Benzoyl peroxide: Kills bacteria and removes excess oil. Retinoids: Unclog pores and promote the exfoliation of dead skin cells. Topical antibiotics: Reduce bacteria on the skin.
Oral medications: Antibiotics: Oral antibiotics may be prescribed for moderate to severe acne to reduce inflammation and bacteria. certain oral contraceptives can help regulate hormones and reduce acne. Isotretinoin (Accutane): A powerful oral medication for severe acne. It is usually reserved for cases that haven't responded to other treatments due to potential side effects.
Light and laser therapy: Certain light-based therapies can target bacteria and reduce inflammation.
Chemical peels: Exfoliate the skin, helping to unclog pores and improve the appearance of acne.
"

}

return data # if index 0 burned leaf

elif pred==1:

print("normal")

data={

"disease":"Good Skin.",

"abstraction":"Good skin is typically characterized by its smooth texture, even tone, and healthy glow. It is free of blemishes, dryness, and excessive oiliness, and it reflects an overall sense of vitality and well-being. Here's a more detailed description of the qualities that define good skin. Remember, good skin is not just about genetics or luck; it is also a result of conscious choices, consistent care, and a commitment to overall health and well-being. By adopting healthy habits, incorporating a personalized skincare routine, and addressing any underlying skin concerns, you can nurture your skin's natural beauty and achieve a healthy, glowing complexion.",

"symptoms_define":"---",

"symptoms_list":"---",

"treatment":"
Choose gentle skincare products: Avoid harsh soaps and cleansers that can strip away natural oils and irritate the skin.
Moisturize regularly: Moisturizing helps maintain skin hydration and prevent dryness.
Exfoliate regularly: Exfoliating removes dead skin cells and promotes skin cell

turnover.
Protect your skin from the sun: Regular use of sunscreen with an SPF of 30 or higher protects against sun damage and premature aging.
Manage stress effectively: Chronic stress can worsen skin conditions and accelerate aging.
Avoid smoking: Smoking damages skin cells and accelerates aging.
Maintain a healthy sleep routine: Adequate sleep allows the skin to repair and regenerate.
"

}

return data

elif pred==2:

print("vascular tumors")

data={

"disease":"Vascular Tumor.",

"abstraction":"Cutaneous vascular proliferations are a vast and complex spectrum. Many appear as hamartomas in infancy; others are acquired neoplasms. Some vascular proliferations are hyperplastic in nature, although they mimic hemangiomas, i.e., neoplasms. The vast majority of the vascular lesions are hemangiomas. Between the hemangiomas and frankly angiosarcomas, there is a group of neoplasms that are angiosarcomas, albeit ones of low grade histologically and, probably, biologically. The term 'hemangioendothelioma' has been created to encompass these neoplasms. Vascular proliferations are, fundamentally, composed of endothelial cells. Some hemangiomas, however, contain also abundant pericytic, smooth muscle, or interstitial components, or a combination of them. These heterogeneous cellular components are present usually in hemangiomas. Some of the newly described vascular proliferations, however, are difficult to differentiate from some of the angiosarcomas. Others are markers, occasionally, of serious conditions such as Fabry's Disease (angiokeratoma) and POEM's syndrome (glomeruloid hemangioma). Kaposi's sarcoma continues to be an enigma. The demonstration of Herpes virus 8 in this condition raises doubt about its neoplastic nature. The demonstration of endothelial differentiation of its nodular lesions is tenuous and its true

nature remains unresolved. While physicians have known about post-mastectomy angiosarcomas from the origin of the radical mastectomy, a new group of unusual vascular proliferations of the mammary skin are being defined. These lesions arise in the setting of breast-conserving surgical treatment with adjuvant radiation therapy. The incubation period is usually 3 to 5 years, in contrast with the 10, or more, in classical cases of post-mastectomy angiosarcoma. These lesions usually are subtle, both clinically and histologically, in contrast with the 'classical,' dramatic presentation of mammary angiosarcoma. The spectrum of findings ranges from 'simple' lymphangiectasia-like vascular proliferations to unequivocal angiosarcomas. The pathogenesis of these lesions remains a mystery. There are very few clues that allow one to separate hemangiomas from angiosarcomas. The presence of heterologous cellular elements and, particularly, well-developed smooth muscle components tends to favor a hemangioma. Similarly, the presence of thrombosis usually supports hemangioma. Nevertheless, there are no unequivocal or reliable individual diagnostic criteria. A thorough knowledge of the different conditions and their differential diagnoses eventually leads to the proper diagnosis in most cases.",

"symptoms_define":"Clinical experts may use a variety of tests and diagnostic tools to evaluate vascular tumors. The specific tests conducted can depend on the suspected type of vascular tumor and the patient's symptoms.",

"symptoms_list":"
Pain: Vascular tumors may cause pain in the affected area. The pain can range from mild to severe and may be constant or intermittent.
Swelling:Tumors involving blood vessels can lead to swelling in the affected region. The extent of swelling depends on the size and location of the tumor.
Bruising: Easy bruising or the development of unusual bruises may be a symptom of certain vascular tumors.
Bleeding: Vascular tumors may be associated with bleeding, either externally or internally. This can manifest as visible bleeding, such as from the skin, or internal bleeding leading to anemia.
Skin changes: Changes in skin color or texture overlying the tumor may occur. This can include redness, bluish discoloration, or a warm feeling in the affected area.
Functional impairment: Depending on the location and size of the tumor, there may be functional impairment of nearby organs or structures. For example, a vascular tumor in the brain may cause neurological symptoms.
",

"treatment":"
Observation and Monitoring:
Small, asymptomatic vascular tumors may not require immediate treatment. In such cases, the healthcare provider might opt for a watch-and-wait approach, monitoring the tumor for any changes.
Medications:
Corticosteroids: For certain benign vascular tumors like infantile hemangiomas, corticosteroids may be prescribed to help reduce the size of the tumor.
Propranolol: This beta-blocker has been found to be effective in treating infantile hemangiomas, especially those that are proliferating rapidly.
Surgery:Surgical removal may be considered for some vascular tumors, particularly if they are causing symptoms, growing rapidly, or if there's a concern about malignancy. For benign tumors like hemangiomas, surgery may be performed to remove the tumor and, in some cases, reconstruct affected tissues.
Radiation Therapy:
Radiation therapy may be used in the treatment of some vascular tumors, particularly malignant ones like angiosarcomas. It may be used as a primary treatment or in conjunction with surgery.
Embolization:
Embolization is a procedure in which substances are injected into blood vessels to block or reduce blood flow to the tumor. This may be used for certain types of vascular tumors, particularly if they are difficult to reach surgically.
Chemotherapy:Chemotherapy may be considered for certain vascular tumors, especially if they are malignant and have spread to other parts of the body.
"

}

return data

elif pred==3:

print("fungal")

data={

"disease":"Fungal Skin.",

"abstraction":"The treatment of fungal diseases is typically carried out by medical professionals, such as doctors or healthcare providers. The specific approach to treatment depends on the type of fungal infection, its severity, and the patient's overall health. Common fungal infections include skin infections (such as ringworm or athlete's foot), nail infections, and systemic infections.Topical Antifungals: For localized infections on the skin

or nails, topical antifungal creams, ointments, or powders are often prescribed. Oral Antifungals: Systemic or widespread fungal infections may require oral antifungal medications. These medications are absorbed into the bloodstream and can reach affected areas throughout the body. In cases of fungal infections on the scalp or other hair-bearing areas, antifungal shampoos or washes may be recommended.",

"symptoms_define":"Fungal diseases can affect various parts of the body and manifest in a wide range of symptoms. The specific symptoms depend on the type of fungus involved and the part of the body affected. Here are some common symptoms associated with fungal diseases:",

"symptoms_list":"
Skin Infections:
Ringworm (Tinea corporis):Red, itchy, and circular rashes on the skin.
Athlete's Foot (Tinea pedis):Itchy, red, and peeling skin, often between the toes.
Jock Itch (Tinea cruris):Itchy, red rash in the groin area.
Nail Infections:
Onychomycosis:Thickened, discolored, and brittle nails. Nails may become yellow or white.
Oral Infection:
Oral Thrust: White patches on the tongue, onner cheeks, and roof of the mouth. Soreness and difficulty swallowing may also occur.
Respiratory Infections:
Aspergillosis:Cough, wheezing, chest pain, and shortness of breath.
Pneumocystis pneumonia (PCP): Fever, cough, and difficulty breathing, particularly in individuals with weakened immune systems.
Systemic Infections:
Candidemia:Fever and chills. In severe cases, it can lead to organ failure.
Histoplasmosis: Fever, cough, fatigue, and sometimes joint pain. It can affect the lungs and other organs.
",

"treatment":"<h3>Clinical experts use a variety of tests to diagnose fungal diseases. The specific tests conducted depend on the suspected fungal infection and the patient's symptoms. Some common fungal disease tests include:</h3>
Microscopic Examination:
Potassium Hydroxide (KOH) Preparation:This test involves placing a sample of the affected tissue or fluid in a solution of potassium hydroxide. The solution breaks down cells, leaving fungal elements more visible under a microscope.
Fungal Culture: A sample of the infected

tissue or fluid is cultured on a special medium to encourage the growth of fungi. This helps identify the specific type of fungus causing the infection.
Antibody Detection: Some fungal infections trigger the production of specific antibodies, which can be detected in the blood. Enzyme-linked immunosorbent assay (ELISA) is a common method for this purpose.
"

}

return data

#----------

app=Flask(__name__)

app.secret_key="secret key"

@app.route("/", methods=['GET', 'POST'])

def home():

return render_template("index.html")

@app.route("/diganosis", methods=['GET'])

def diagnosis():

return render_template("diganosis.html")

@app.route("/credits", methods=["GET"])

def credits():

return render_template("credit.html")

@app.route("/help", methods=["GET"])

def help():

return render_template("help.html")

@app.route("/analysis", methods=["GET"])

def analysis():

return render_template("analysis.html")

@app.route("/upload/<disease>", methods=['GET','POST'])

def upload(disease):

if request.method=="POST":

```
        if disease=="lung":
            return render_template(upload,disease=disease)
        elif disease=="brain":
            return render_template(upload, disease=disease)
        elif disease=="skin":
            return render_template(upload,disease=disease)
    return render_template("upload.html", disease=disease)
@app.route("/diabetes", methods=['GET','POST'])
def diabetes():
    if request.method=='GET':
        return render_template("diabetesform.html")
    elif request.method=='POST':

        data=request.form
        age = request.form['age']
        hypertension= request.form['hypertension']
        hba1c = float(request.form['hba1c'])
        gendervalue = request.form['gender']
        if(gendervalue=="Female"):
            gender=0
        else:
            gender=1
        smokingHistory = request.form['smokingHistory']
        if(smokingHistory=="never"):
            smoke=4
        elif(smokingHistory=="current"):
            smoke=1
        elif(smokingHistory=="formal"):
            smoke=3
```

```
        else:
            smoke=0
        heartDisease = request.form['heartDisease']
        weight = int(request.form['weight'])
        bloodGlucose=int(request.form['bloodGlucose'])
        bmi=float(request.form['BMI'])
        to_predict = np.array([gender, age, hypertension, heartDisease, smoke, bmi, hba1c,
bloodGlucose])
        result = diabetes_model.predict(X=to_predict)
        print(result)
        return render_template("diabetesform.html")


@app.route("/heart", methods=['GET','POST'])


def heart():
    if request.method=='GET':
        return render_template("heartform.html")
    elif request.method=='POST':
        Age=int(request.form['age']),
        sex =request.form['gender']
        if sex=='male':
            sexno=1
        elif sex=='female':
            sexno=0
        else:
            sexno=1
        chestPainType =int(request.form['chestpain'])
        RestingBP = int(request.form['BP']),
        cholesterol =int(request.form['Cholesterol']),
```

```
        FastingBS=int(request.form['bloodsugar']),
        RestingECG=int(request.form['ECG'])
        MaxHR =int(request.form['MaxHR']),
        ExerciseAngina=int(request.form['ExerciseAngina'])
        Oldpeak=float(request.form['OldPeak']),
        ST_Slope=int(request.form['stslope'])

        # Include Sex in the input data
        input_data = [[Age, sexno, chestPainType, RestingBP, cholesterol, FastingBS,
RestingECG, MaxHR, ExerciseAngina, Oldpeak, ST_Slope]]
        # Make predictions
        prediction = heart_model.predict(input_data)
        # Display the result
        if prediction == 0:

print("No heart disease")
            data={
            "disease":"Normal Report",
            "abstraction":"A healthy heart is the cornerstone of overall well-being, playing a
pivotal role in sustaining life and vitality. The term 'healthy heart' encompasses a state
where the heart functions optimally, efficiently pumping blood throughout the body and
supplying vital nutrients and oxygen to every cell. Achieving and maintaining a healthy
heart involves a multifaceted approach, integrating lifestyle choices, dietary habits, and
regular physical activity.",
            "symptoms_define":"Here some ways to tell if your heart is healthy — now and in
the future.",
            "symptoms_list":"<li>Controlled Blood Pressure. </li><li>Good Sleep(Around 8 to
9 hours per 24 hours).</li><li>Good Oral Health.</li><li>High Energy Levels.<li>",
            "treatment":""
```

```
        }

        return render_template(result, data=data)

    else:
        print("Heart disease")


        data={
        "disease":"Heart Disease",
        "abstraction":"The diagnosis of heart disease in most cases",
        "symptoms_define":"Coronary artery disease is a common heart condition t
        "symptoms_list":"<li>Chest pain, chest tightness, chest pressure and chest discomfort (angina)</li><li>Shortness of breath</li><li>Pain in the neck, jaw, throat, upper belly area or back</li><li>Pain, numbness, weakness or coldness in the legs or arms if the blood vessels in those body areas are narrowed</li>",
        "treatment":"The same lifestyle changes used to manage heart disease may also help prevent it. Try these heart-healthy tips:<br><li>Don't smoke.</li><li>Eat a diet that's low in salt and saturated fat.</li><li>Exercise at least 30 minutes a day on most days of the week.</li><li>Maintain a healthy weight.</li><li>Reduce and manage stress.</li><li>Control high blood pressure, high cholesterol and diabetes.</li><li>Get good sleep. Adults should aim for 7 to 9 hours daily.</li>"

        }

        return render_template(result, data=data)

#-------------------------------------------------------------------------------------------------------



@app.route("/predict/<disease>", methods=['POST'])
def predict(disease):
   if request.method=='POST':
      if disease=='lungs':
```

```
        print("lungs function is working")
        file=request.files['image']
        filename=file.filename
        if filename=="":
            flash(flash_msz, "error")
            return render_template('index.html')
        file_path = 'userUpload/' + filename
        file_path_full = 'static/' + file_path
        file.save(file_path_full)
        data=lungs_models_prediction(lungs_Images=file_path_full)
        file_url = url_for('static', filename=file_path)
        return render_template(result, data=data, user_image=file_url)
    elif disease == 'brain':
        file=request.files['image']
        filename=file.filename
        print(filename)
        if filename=="":
            flash(flash_msz, "error")
            return render_template('index.html')
        file_path = 'userUpload/' + filename
        file_path_full = 'static/' + file_path
        file.save(file_path_full)
        data=brain_models_prediction(brain_Images=file_path_full)
        file_url = url_for('static', filename=file_path)
        return render_template(result, data=data, user_image=file_url)
    elif disease=='skin':
        file=request.files['image']
        filename=file.filename
```

```
            if filename=="":
                flash(flash_msz, "error")
              return render_template('index.html')


          file_path = 'userUpload/' + filename
            file_path_full = 'static/' + file_path
            file.save(file_path_full)
            data=skin_models_prediction( skin_Images=file_path_full)
            file_url = url_for('static', filename=file_path)
            return render_template(result, data=data, user_image=file_url)
#-----------------------------------------------------------------------------------------------------
if __name__=="__main__":
    index='index.html'
    credit='credit.html'
    help='help.html'
    upload='upload.html'
    flash_msz="Please Enter the Images. Image is not Inserted!!"
    app.run(debug=True)
```

CHAPTER NO 6

RESULTS & DISCUSSION

CHAPTER 6

RESULTS & DISCUSSION

6.1 RESULTS AND DISCUSSIONS

Fig 6.1 Medical Website

When our web app will start the landing on our web app will displayed as shown in fig 6.1.

Fig 6.2 Diagnosis of Disease

To detect the disease, we have 5 different categories. The disease page will appear when we are click on Diagnosis button as shown in fig 6.2.

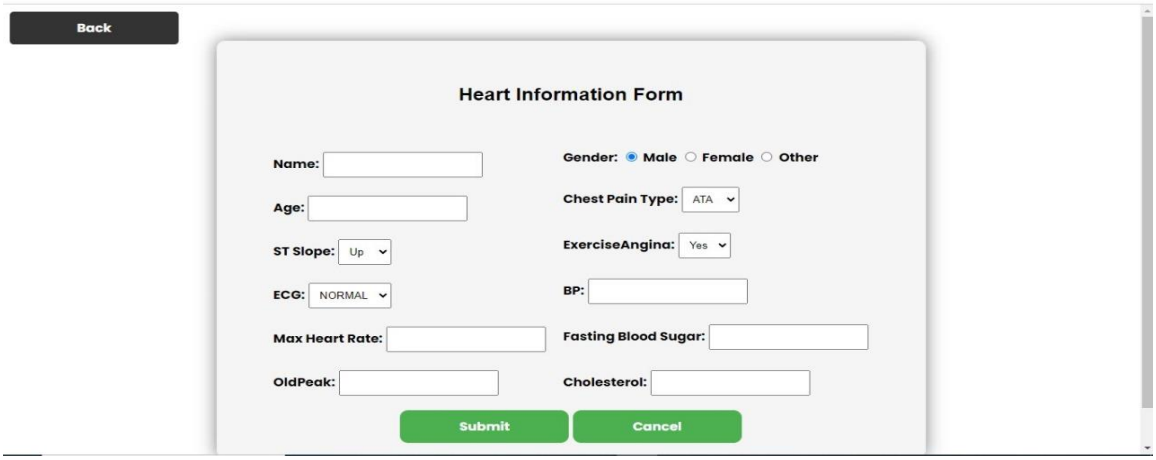


Fig 6.3 Heart Information Form

When we want to predict Heart Disease, we need to fill the form as shown in the fig 6.3.

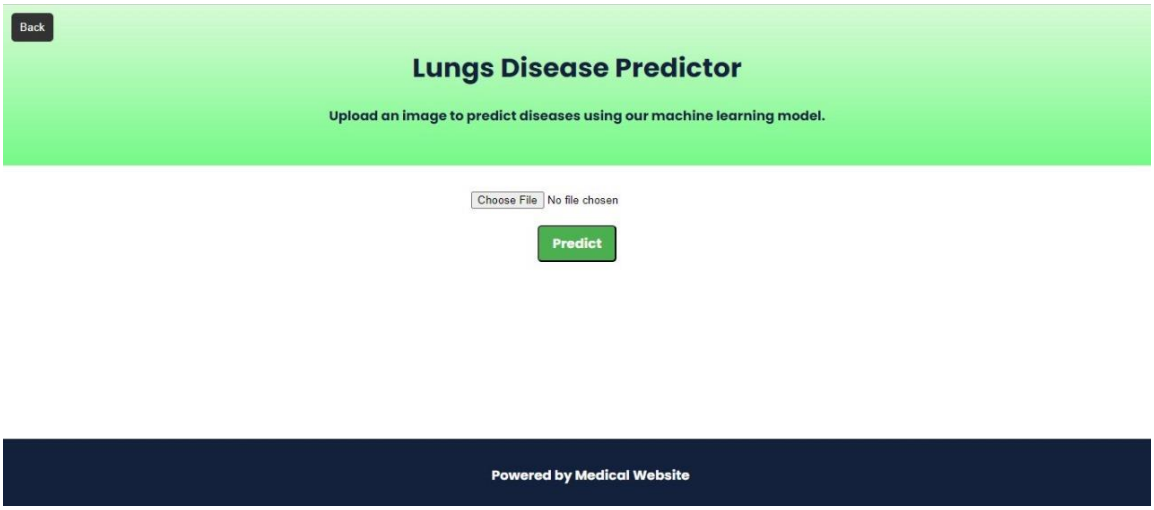


Fig 6.4 Lung Disease Predictor

When we want to predict skin, lungs, brain disease, we need to upload image respectively as shown in fig 6.4.

Fig 6.5 Diabetes Information Form

When we want to predict Diabetes Disease, we need to fill the form as shown in fig 6.5.

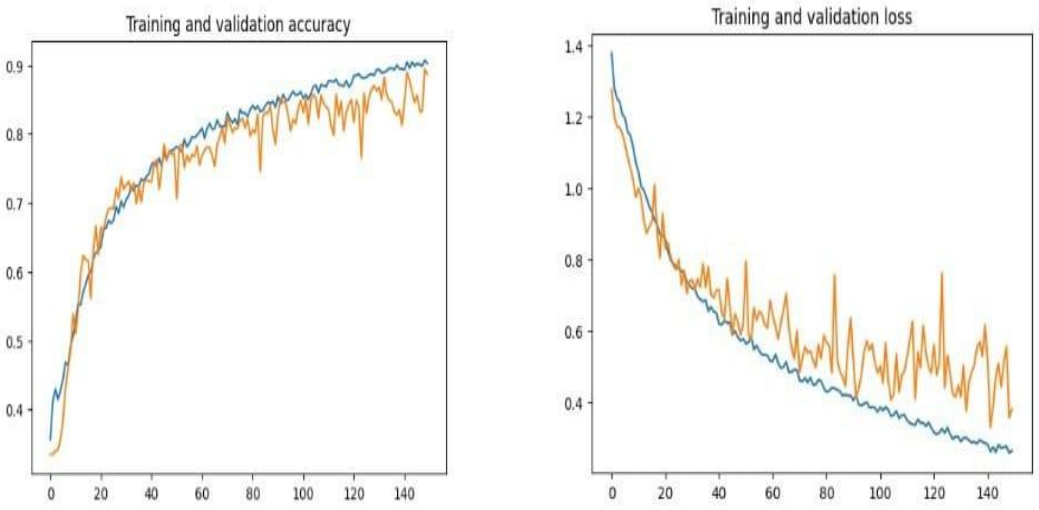


Fig 6.6 Skin Disease Graph

The diagram shows that the skin disease model has high training and validation accuracy, both above 90%. This suggests that the model is learning well on the training data and is able to generalize to new data. The validation loss is also low, which is a good sign.

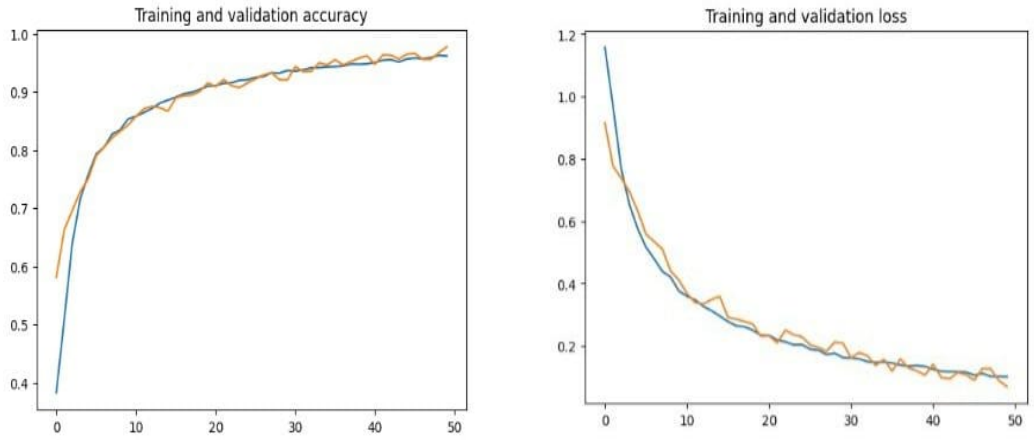


Fig 6.7 Brain Disease Graph

The diagram shows that the brain disease model has high training and validation accuracy, both above 90%. This suggests that the model is learning well on the training data and is able to generalize to new data. The validation loss is also low, which is a good sign.

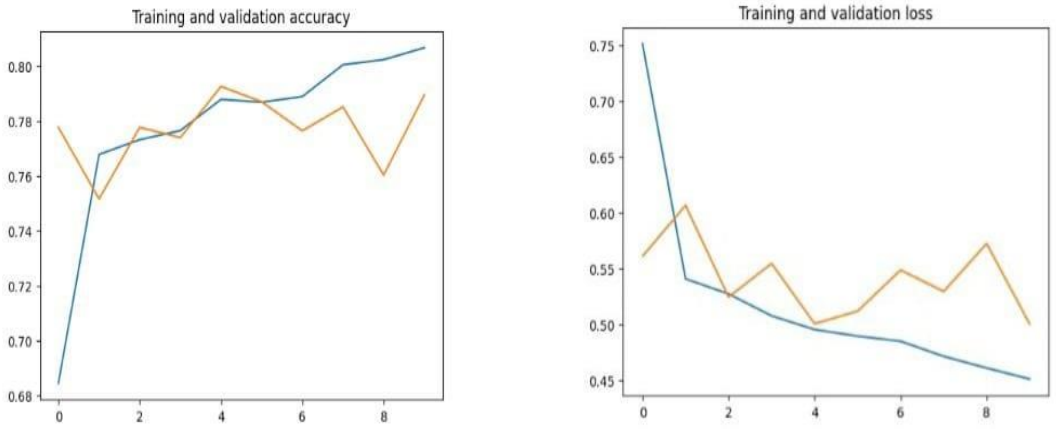


Fig 6.8 Lung Disease Graph

The graph disease shows that the lungs disease model has an accuracy of over 87% on both the training and validation sets. The loss is also relatively low, around 0.45 on the training set and 0.5 on the validation set. This suggests that the model is well-trained and has good generalization ability and also gives information about overfitting and underfitting.

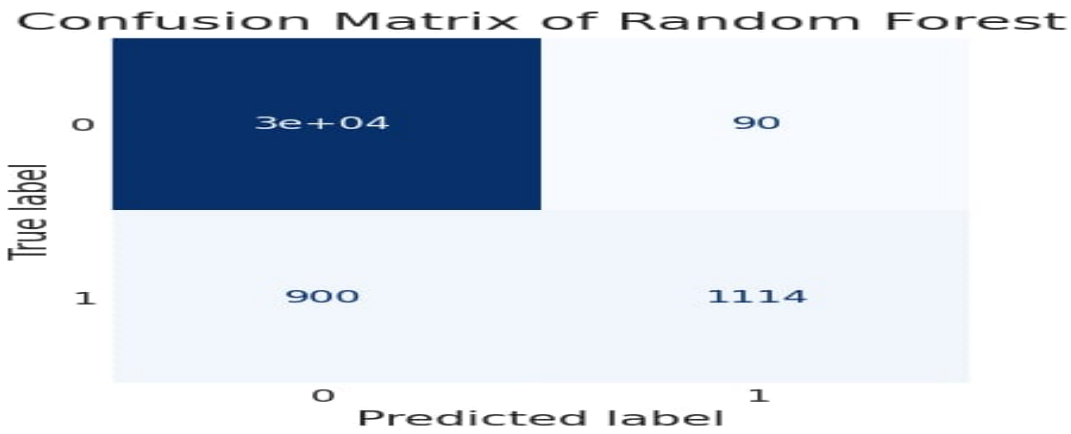


Fig 6.9 Confusion Matrix of Diabetes Disease

The confusion matrix for the diabetes model shows that the model is able to predict both positive and negative cases with high accuracy. The True Positive Rate (TPR) is 0.90, which means that the model correctly predicts 90% of the people who actually have diabetes. The True Negative Rate (TNR) is 0.99, which means the model correctly predicts 99% of the people who do not have diabetes. This suggests that the model is very reliable at both predicting and ruling out diabetes.

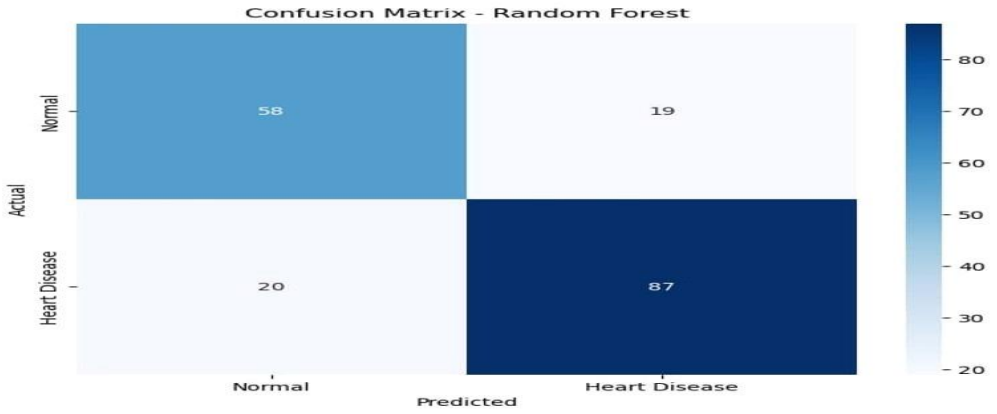


Fig 7.0 Confusion Matrix of Heart Disease

The confusion matrix for the heart model shows that the model is able to predict both normal and heart disease cases with high accuracy. The True Positive Rate (TPR) is 0.87, which means that the model correctly predicts 87% of the people who actually have heart disease. The True Negative Rate (TNR) is 0.80, which means the model correctly predicts 80% of the people who do not have heart disease. This suggests that the model is very reliable at both predicting and ruling out heart disease.

CHAPTER NO 7

ADVANTAGES AND APPLICATIONS

CHAPTER 7

ADVANTAGES AND APPLICATIONS

7.1 ADVANTAGES

1. Early Disease Detection
2. Multi Disease Identification
3. Prognosis and Treatment Planning.
4. Efficiency and Speed.
5. Cost Savings
6. Improved Patient Outcomes.
7. Accessibility.
8. Reduced Workload for Healthcare Professionals.

7.2 APPLICATIONS

1. Emergency Response.
2. Personal Health management.
3. Education and training.
4. Public Health Initiatives.
5. Reducing Medical Errors.
6. Research and Clinical Trials Recruitment.
7. Patient Empowerment.

CHAPTER NO 8

CONCLUSION & FUTURE SCOPE

CHAPTER 8

CONCLUSION & FUTURE SCOPE

8.1 CONCLUSION

We have **designed** a web application and completed its development. Our web application will provide integrated framework for disease identification and prognosis, is a beacon of progress in medical science. Leveraging machine learning algorithms and deep neural networks. We have applied **engineering knowledge** to **analyze** the complex task of diagnosing multiple diseases from images such as lungs disease, skin disease, brain disease, diabetes disease, and heart disease. This involves different input images and records, utilizing deep learning techniques. We have **investigated** the available application to find out the new solutions and updates. We have used **modern tool** visual studio for the implementation of the application. This application is useful for **society** without any adverse effects on **environment** During this project tenure we have applied **professional ethics** and understood the importance of **individual** and **team work** and **communication skills** while presenting project in various competitions and seminar for **project management**. This solution can be developed at generalized level for multiple sectors for **life-long learning**.

8.2 FUTURE SCOPE

Data from private hospitals was used in several research. In order to obtain larger datasets, efforts such as de-identification of personal patient data may be undertaken. If more data was supplied, the classifiers developed would be more accurate. This is due to the fact that more data means more diversity. As the model is trained on more examples, it becomes more general, the generalization error is reduced. Medical information is difficult to come by. As a result, if the databases were made public, researchers would have access to additional information. In the future, we aim to expand the range of diseases covered, including specific categories.

REFERENCES

Papers:

[1] Mulla Abdul Faheem, “Deep Learning Approach for Unprecedented Lung Disease Prognosis” International Research Journal of Engineering and Technology (IRJET) Volume: 10 Issue: 06 Jun 2023.

[2] “Skin Disease Detection using Image Processing Technique” International Research Journal of Engineering and Technology (IRJET) Volume:07 Issue: 06 June 2020.

[3] P. Mlynarski, H. Delingette, A. Criminisi, and N. Ayache, “Deep learning with mixed supervision for brain tumor segmentation,” Journal of Medical Imaging, vol. 6, no. 3, p. 1, 2019.

[4] C. B. C. Latha, S. C. Jeeva, and S. Carolin Jeeva, “Improving the accuracy of prediction of heart disease risk based on ensemble classification techniques,” Informatics in Medicine Unlocked, vol. 16, Article ID 100203, 2019.

[5] Abbas Khosravi, Syed Moshfeq Salaken, Amin Khatami, Saeid Nahavandi, Mohammad Anwar Hose “Lung Cancer Classification Using Deep Learned Features on Low Population Dataset” IEEE 30th Canadian Conference on Electrical and Computer Engineering (CCECE) 2017.

[6] Shadab Adam Pattekari and Asma Parveen “PREDICTION SYSTEM FOR HEART DISEASE USING NAIVE BAYES.” International Journal of Advanced Computer and Mathematical Sciences 2015.

[7] S. Florence, N.G.Bhuvaneswari Amma, G.Annapoorani, K.Malathi. “Predicting the Risk of Heart Attacks using Neural Network and Decision Tree.” International Journal of Innovative Research in Computer and Communication Engineering 2014.

Websites:

1. https://www.iaeng.org/publication/WCECS2013/.
2. https://aiinhealthcare.slack.com/
3. https://www.technologyreview.com/healthcare/

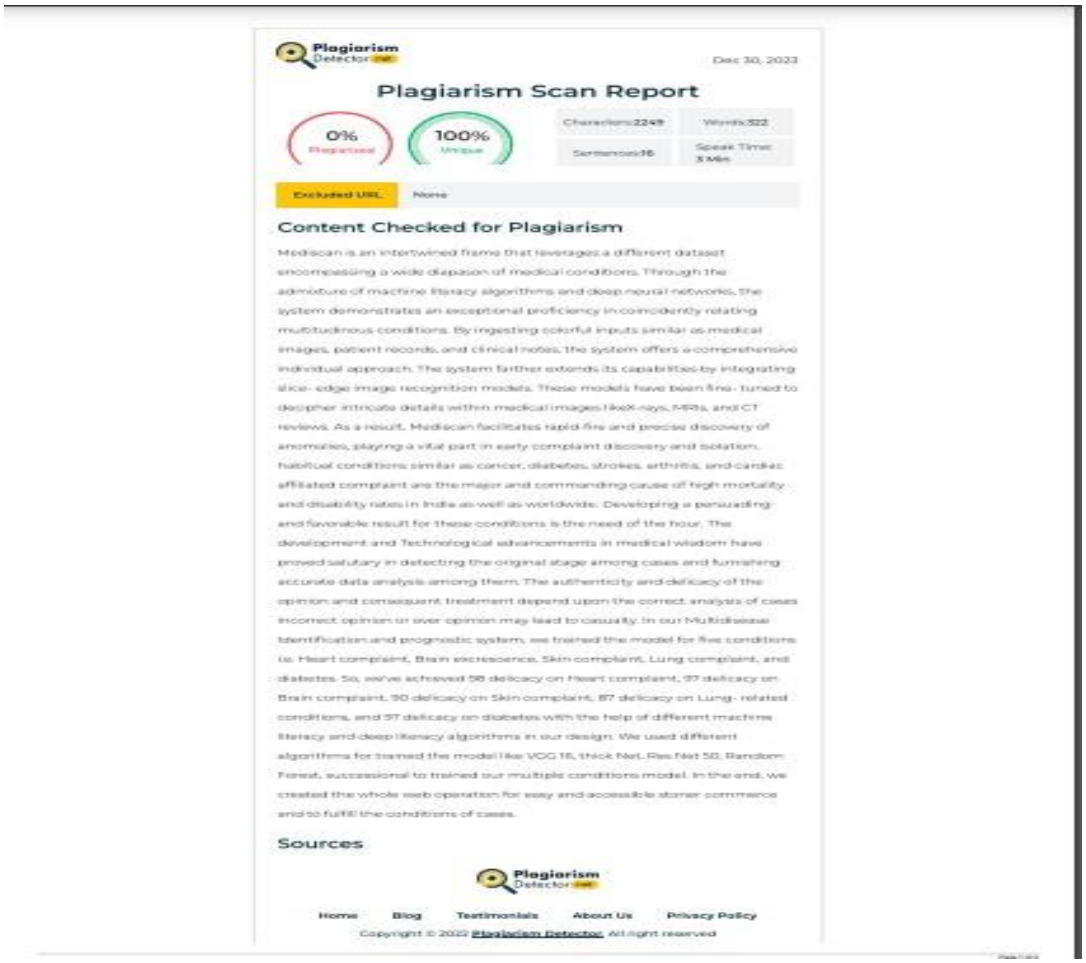
Books/Articles:

1. Ahmed, Shaymaa Taha, and Suhad Malallah Kadhem."Using Machine Learning via Deep Learning Algorithms to Diagnose the Lung Disease Based on Chest Imaging: A Survey." International Journal of Interactive Mobile Technologies 15.16 (2021).
2. Priya, T., and T. Meyyappan. "Disease Prediction by Machine Learning Over Big Data Lung Cancer. “International Journal of Scientific Research in Computer Science, Engineering and Information Technology (2021): 16-24.

APPENDIX I

PLAGIARISM REPORT

PLAGIARISM REPORT



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Mediscan is an intertwined frame that leverages a different dataset encompassing a wide dispason of medical conditions. Through the admixture of machine literacy algorithms and deep neural networks, the system demonstrates an exceptional proficiency in coincidently relating multitudinous conditions. By ingesting colorful inputs similar as medical images, patient records, and clinical notes, the system offers a comprehensive individual approach. The system farther extends its capabilities by integrating slice- edge image recognition models. These models have been fine- tuned to decipher intricate details within medical images like X-rays, MRIs, and CT reviews. As a result, Mediscan facilitates rapid- fire and precise discovery of anomalies, playing a vital part in early complaint discovery and solution. habitual conditions similar as cancer, diabetes, strokes, arthritis, and cardiac- affiliated complaint are the major and commanding cause of high mortality and disability rates in India as well as worldwide. Developing a persuading and favorable result for these conditions is the need of the hour. The development and Technological advancements in medical wisdom have proved salutary in detecting the original stage among cases and furnishing accurate data analysis among them. The authenticity and delicacy of the opinion and consequent treatment depend upon the correct analysis of cases incorrect opinion or over opinion may lead to casualty. In our Multidisease identification and prognostic system, we trained the model for five conditions ie. Heart complaint, Brain excrescence, Skin complaint, Lung complaint, and diabetes. So, we've achieved 98 delicacy on Heart complaint, 97 delicacy on Brain complaint, 90 delicacy on Skin complaint, 87 delicacy on Lung- related conditions, and 97 delicacy on diabetes with the help of different machine literacy and deep literacy algorithms in our design. We used different algorithms for trained the model like VGG 16, thick Net, Res Net 50, Random Forest, successional to trained our multiple conditions model. In the end, we created the whole web operation for easy and accessible stoner commerce and so fulfill the conditions of cases.

Sources

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APPENDIX II

PUBLISHED PAPER

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INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

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Mediscan: An Multidisease Identification and Prognosis System using AI.

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Abstract: The diseases such as heart disease, cancer, diabetes, stroke, and arthritis are the leading causes of disability and death in India and worldwide. Compared to other diseases, these types of diseases are characterized by high mortality. It is therefore necessary to develop a promising solution for chronic diseases. The growth of medical data in healthcare and the accurate analysis of medical data bring benefits for early disease detection, patient care and social services. However, the analysis of patients depends on the correctness of the diagnosis and subsequent treatment. Misdiagnosed patients lead to death from chronic diseases. Due to the high risk of diagnosis, there is therefore a need for accurate diagnostic care for chronic diseases. Therefore, we propose a machine learning-based diagnostic system that offers promising solutions with high accuracy. The proposed system covers the detection of many diseases such as lung cancer, brain tumors and heart diseases, as well as the prediction of developmental stages. The high mortality rate due to chronic diseases such as heart disease, lung cancer and brain tumors requires the development of an appropriate diagnostic system to support doctors. A misdiagnosis of leads to people dying. We therefore need to work on an accurate diagnosis of many diseases. A lot of work has been done on various diseases, but no promising solution for complete and accurate diagnosis has been found. The proposed system covers the detection of many diseases such as lung cancer, brain tumors and heart diseases, as well as the prediction of developmental stages. We are trying to develop a multi-disease detection and disease stage prediction system that enables early diagnosis and saves many lives by reducing mortality from chronic diseases.

I. INTRODUCTION

In recent years, the integration of artificial intelligence (AI) into various industries has brought transformative advances, and healthcare is no exception. The ability of AI to process complex data, recognize patterns, and make informed decisions has paved the way for more accurate and efficient medical diagnoses and prognoses. This paper introduces "MediScan," a cutting-edge Multi- Disease Identification and Prognosis System that harnesses the capabilities of AI to revolutionize the landscape of medical diagnosis and patient care. The challenge of identifying and prognosticating multiple diseases in a timely and precise manner has long been a central concern in the healthcare industry. Traditional diagnostic approaches often rely on the manual interpretation of medical images, clinical data, and patient history, which can be time-consuming and prone to human error. Moreover, the simultaneous presence of multiple co-existing diseases in a patient further complicates the diagnostic process. MediScan addresses these challenges by leveraging advances in artificial intelligence, particularly in the areas of machine learning, image recognition and natural language processing. system The Study not only aims to identify a broad range of diseases using a variety of diagnostic data, but also provides information about the possible course of these diseases so that healthcare providers can make informed decisions regarding patient care. MediScan is an integrated framework that leverages a diverse dataset encompassing a wide spectrum of medical conditions. Through the amalgamation of machine learning

algorithms and deep neural networks, the system demonstrates an exceptional proficiency in concurrently identifying numerous diseases. AI models within the system are trained on extensive datasets to recognize patterns, symptoms, and risk factors associated with multiple diseases simultaneously. This enables rapid and accurate disease identification, even in cases where diseases coexist or present with atypical symptoms. These systems go beyond simple diagnosis by providing healthcare professionals with valuable insights into disease progression and prognosis by analyzing historical patient data, treatment outcomes and the latest medical research, AI algorithms can predict the likely course of the disease. develops and recommends personalized treatment plans.

II. LITERATURE SURVEY

Detection of skin diseases using image processing techniques » International Research Journal of Engineering and Technology (IRJET) Volume: 07 Issue: June 6, 2020. Presents an automated method for diagnosing melanoma, practically using a series of thermoscopic images. The resulting topographies are based on a grayscale co-occurrence matrix (GLCM) and the use of a multilayer perceptron classifier (MLP) to classify melanocytic nevi and malignant melanomas. The first approach, "Automatic Iteration Counter," is faster, but the second, "Standard Iteration Counter," provides better accuracy, which is 100% for the training set and 92% for the test set. This will be the subject of research will design and study a system that brings together the results of previous images of pigmented skin lesions (PSL), their analysis, relevant observations and hypotheses from medical experts using a prototyping methodology. "Hybrid Deep Learning for Detecting Lung Disease Using Ultrasound" 2021 IJRAR March 2021, Volume 8, Issue 1 This article attempts to explore deep learning techniques for computational analysis of lung ultrasound images, which offer a promising avenue in screening and Diagnosis of lung diseases. . Recent advances in deep learning support the identification and classification of lung diseases in medical images. Detection of skin diseases based on the image Processing Technology » International Research Journal of Engineering and Technology (IRJET) Volume: 07 Issue: The article presents a practical method for the automatic diagnosis of melanoma using a series of thermoscopic images. The extracted topographies are based on a grayscale co-occurrence matrix (GLCM) and use a multi-layer perceptron classifier. June 6, 2020. International Research Journal of Engineering and Technology (IRJET) "A deep learning approach for unprecedented lung disease prediction" This article focuses on the development and implementation of a binary classification model for disease prediction of lung cancer from X-ray images. By harnessing the power of machine learning algorithms, particularly those in the field of computer science known as machine learning, we strive to assign accurate class labels to data in a problem domain. Throughout the project, we use popular Python libraries such as Tensor Flow, Keras and NumPy to increase prediction accuracy. The results of this study provide valuable information for the prediction of lung disease using X-rays and enable potential advances in diagnostic and prognostic methods. Artificial Intelligence Disease Prediction System » International Research Journal of Engineering and Technology (IRJET) Volume: 10 Issue: June 6, 2023 This research paper works with archived medical data expressed as descriptions of possible diseases. Given the breadth of the clinical field, the number of hypotheses contained in the information varies from several to several thousand. Skin Disease Detection Using Machine Learning » 2023 IJCRT Volume 11, Issue 5, May 2023ISSN: 2320-2882 This research paper proposes a system for dissection of skin diseases using color images without requiring the intervention of a doctor. The system consists of two stages: the first is to detect infected skin using color, average clustering and color gradient image processing techniques to identify diseased skin, and the second is to detect the type of disease using artificial neural networks to classify. The system was tested on six types of skin diseases with an average accuracy of 95.99% and the second phase 94.016%. "Deep Learning Based Skin Disease Detection" International Journal of Scientific Research in Science, Engineering and Technology (IJSRSET) In this research paper, we study how these people work based on a network model structure based on Deep Neural Fusion (CNN) developed skin diseases. DenseNet201 and also photos clinical information forms the input for this interbinary classifier, which is used to diagnose local features. Images 2023, 12, 4383 of 19. Only the interim display sample achieved a reliability and sensitivity of 95.1% and 83.5% respectively. Allogenic et al. developed a series of coneural algorithms for the detection of basal cell carcinoma. "Heart Disease Predictive Analytics" 2022 IJCRT Volume 10, Issue 10, October 2022 Several works have been carried out on disease prediction systems using various machine learning algorithms and data mining techniques. KPolaraju et al. proposed the prediction of heart disease using multiple regression model, showing that the MLR model is suitable for predicting heart disease. The work is performed using a training set consisting of multiple instances with specific attributes in question. According to the results obtained, the accuracy of the classification regression algorithm is the best compared to other algorithms. Marjia et al. developed the prediction of heart disease. "Predicting diabetic diseases using machine learning algorithms" 2022IJCRT Volume 10, Number 6, June 2022 ISSN: 2320-2882 Covers diabetic disease prediction using SVM,

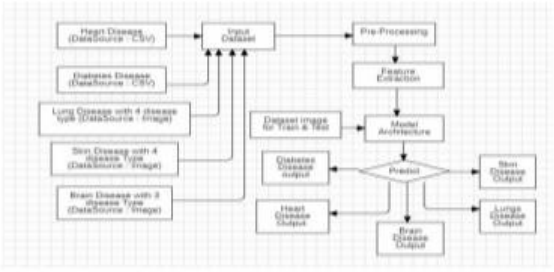
ANN, decision tree, LR and random forest classifiers. Furthermore, by including all current risk factors in the dataset, we observed stable accuracy after classification and cross-validation. We made it to achieves a stable and maximum accuracy of 90%. The main goal is to find the optimal results in terms of Accuracy and computation time for diabetic disease prediction. " "A Machine Learning Model for Prediction of Diabetes and Hypertension Using Ensemble Learning Approach" Published Paper ID: JETIR 2109310 In this paper they worked on diabetes and hypertension and proposed a disease prediction model to predict and classify the disease based on individual's risk factor. Various Machine Learning algorithms like Logistic Regression, Support Vector Machine, Naïve Bayes, Multi-Layer Perceptron, knearest neighbours, Decision Tree, AdaBoost, Gradient Boosting, Random Forest are used for prediction of diabetes and hypertension. The results obtained after a comparative study, showed that Logistic Regression obtained high accuracy of 83.16% on diabetes dataset and Decision Tree and Gradient Boosting obtained most effective accuracy of 100% on hypertension dataset. Prediction on Lung Disease Using K means Algorithm" 2014 IJIRT Volume 1 Issue 11 ISSN: 2349-6002. This presents prediction on lung disease using K means algorithm. This project comprises of three modules. First, admin module which is administrator's login there the details of the patient will be generated. Now the user will authenticate based on their credentials. The Second module is User module there the patient enters his username and password to predict cancer. Third module is Cancer prediction module in which the result will be predicted at the last stage with the help of K means algorithm. The K means will classify the input features into two classes of cancer type (benign and malignant). A various Study of MRI brain Image based on Segmentation" 2019 IJRAR June 2019, Volume 6, Issue 2. This paper seeks to explain BT, its forms and various methods of brain tumor identification and segmentation. The aim of survey paper is to present different automated brain MRI BTS methods. The current brain tumor detection (BTD) and brain MRI segmentation techniques are explored.

III. RESEARCH METHODOLOGY

The field of healthcare is characterized by the complexity and diversity of diseases, often requiring accurate and timely diagnosis for effective treatment. However, the traditional diagnostic approaches are limited by their reliance on manual analysis and expertise, leading to potential errors, delays, and missed opportunities for early intervention. Moreover, the increasing volume of medical data, including images, patient records, and clinical notes, poses a significant challenge for healthcare practitioners to efficiently and comprehensively identify and prognose multiple diseases simultaneously. In light of these challenges, the development of an advanced Multi-Disease Identification and Prognosis System using AI, referred to as "MediScan," aims to revolutionize disease diagnosis and patient care. This system seeks to leverage the power of artificial intelligence to accurately and efficiently identify a wide range of diseases from various diagnostic inputs while also providing prognostic insights for personalized treatment planning. These systems go beyond simple diagnosis by providing healthcare professionals with valuable insights into disease progression and prognosis. By analyzing historical patient data, treatment outcomes, and the latest medical research, AI algorithms can predict how a disease is likely to develop and recommend personalized treatment plans. In contemporary healthcare, the accurate and timely identification of multiple diseases in patients is a complex and resource-intensive challenge. Traditional diagnostic methods often rely on individual expertise and subjective interpretation, which can lead to delayed diagnoses and suboptimal treatment outcomes. To address these issues, there is an imperative need to develop a Multi-Disease Identification and Prognosis System leveraging Machine Learning (ML) and Deep Learning (DL) techniques.

IV. PROPOSED SYSTEM

- To identify multiple diseases.
- Advancement of Machine Learning Technique.
- To Enhance Patient Care.
- Support for Healthcare Decision making.
- Real-Time Analysis.
- Accuracy Enhancement.
- Prognosis Capability.
- Transfer Learning.
- Multi-Model Integration.
- Data Quality and Preprocessing.



System Architecture

Proposed Modules/Steps:

- Download the Datasets and Extract them.
- Defining the Directories in Dataset.
- Define the Model.
- Data Pre-processing.
- Training the Model.
- Running the Model.
- Creating a Web Application.
- Deployment.

Proposed Algorithm

- We use CNN architecture to train to find out different types of disease with the help of image datasets.
- We will create a architecture layer over a CNN with the help of Resent, VGG16 Models.
- We also find out diseases with help of Machine learning Approach.
- We create User Friendly Interface to upload images data and prediction of expected output.

V. CONCLUSION

This System can contribute to educating healthcare professionals, patients, and the general public about the importance of early disease detection, prevention, and management. Overall, the expected outcomes of a multi-disease identification system is to enhance our ability to detect and manage diseases more effectively, ultimately improving healthcare outcomes and public health. Multidisease identification system can advance scientific research by providing a better understanding of disease mechanisms, genetics, and epidemiology. This knowledge can lead to further research opportunities and discoveries.

REFERENCES

[1] "Skin Disease Detection using Image Processing Technique" International Research Journal of Engineering and Technology(IRJET) Volume:07 Issue: 06 June 2020.

[2] S. Manogaran, and D. Lopez. Authors: S. Manogaran, and D. Lopez. Published in Journal of King Saud niversity - Computer and Information Sciences, 2018 "Prediction of Hurt Disease using deep Learning Techniques"

[3] S. B. Kang, Y. K. Cho, and D. R. Lee. "Deep Learning for Brain Tumor Classification" Computational Intelligence andNeuroscience, 2019.

[4] Ishaq Azhar Mohammed. (2019). A SYSTEMATIC LITERATURE MAPPING ON SECURE IDENTITY MANAGEMENT USING BLOCKCHAIN TECHNOLOGY. International Journal of Innovations in Engineering Research and Technology, 6(5), 86– 91.

[5] Abbas Khosravi ,Syed Moshfeq Salaken, , Amin Khatami, Saeid Nahavandi, Mohammad Anwar Hose "Lung Cancer Classification Using Deep Learned Features on Low Population Dataset" IEEE 30th Canadian Conference on Electrical and Computer Engineering (CCECE) 2017.

[6] Hasan, A., Meziane, F., Aspin, R., & Jalab, H. (2016). "Segmentation of Brain Tumors in MRI Images Using Three-Dimensional Active Contour without Edge. Symmetry," 8(11), 132. doi:10.3390/sym8110132.

[7] Shadab Adam Pattekari and Asma Parveen "PREDICTION SYSTEM FOR HEART DISEASE USING NAIVE BAYES." International Journal of Advanced Computer and Mathematical Sciences 2015.

[8] S.Florence, N.G.Bhuvaneswari Amma , G.Annapoorani , K.Malathi (2015). "Predicting the Risk of Heart Attacks using Neural Network and Decision Tree." International Journal of Innovative Research in Computer and Communication Engineering 2014 .

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Mediscan: An Multidisease Identification and Prognosis System using AI

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Abstract: ***Chronic diseases such as cancer, diabetes, strokes, arthritis, and cardiac-related disease are the major and leading cause of high mortality and disability rates in India as well as worldwide. Developing a convincing and favorable solution for these diseases is the need of the hour. The development and Technological advancements in medical science have proved beneficial in detecting the initial stage among patients and providing accurate data analysis among them. The authenticity and accuracy of the diagnosis and consequent treatment depend upon the correct analysis of patients; incorrect diagnosis or overdiagnosis may lead to casualty. Therefore, at most care and precautions must be taken for the correct examination of illness or disease as misdiagnosis may result in the death of a patient. However, a Machine learning, Deep learning-based diagnostic system with high accuracy proposed here, can offer promising solutions to identify the correct & accurate cause of such chronic diseases. Machine Learning-based diagnostic systems can detect diseases such as Lung disease, brain tumors, Heart disease, Skin disease, diabetes, and prophecy of developmental stages in patients. A proper or suitable diagnostic system may prove helpful for doctors in reducing the high mortality rate among patients with these chronic diseases. Great work has to be done on the accurate diagnosis of many diseases. A lot of work has been done in this direction but no convincing solution for accurate diagnosis has been found till now with the help of machine learning Deep learning diagnostics systems we can identify the diseases as well as the developmental stages in many diseases such as Lung disease, Brain tumor, Heart disease, etc. In this way, we can reduce the mortality rate and save money lives. In these Research paper, we have explored various Machine learning and Deep learning algorithms for training and testing the different diseases in our system. With the help of Machine learning and deep learning techniques, we trained our various machine learning and deep learning models using various algorithms for each disease. In our Multidisease Identification and Prognosis system, we trained the model for five diseases i.e. Heart disease, Brain tumor, Skin disease, Lung disease, and diabetes. So, we have achieved 98% accuracy on Heart disease, 97% accuracy on Brain disease, 90% accuracy on Skin disease, 87% accuracy on Lung-related diseases, and 97% accuracy on diabetes with the help of different machine learning and deep learning algorithms in our Project We used different algorithms for trained the model like VGG 16, Dense Net, Res Net 50, Random Forest, Sequential to trained our multiple diseases model. In the end, we created the whole web application for easy and understandable user interaction and to fulfill the requirements of patients.***

Keywords: ***Machine learning, Deep Learning, Training, Prognosis, Multiple diseases, over diagnosis, misdiagnosis, analysis, Mediscan.***

I. INTRODUCTION

Diseases related to the heart, lungs, and brain are the main cause of death or serious medical issues. These diseases are now common for all age groups. Some more diseases related to the skin are also common. Diabetes is one of the most common and lifelong diseases which does not have any cure. So all 4 human body parts (Heart, Lungs, Skin, and Brain) are the major parts on which other body parts are dependent. As we know nowadays, Heart stroke and heart Attack are the most common. This heart-related disease cannot be easily handled and cured. And these diseases don't have any pre-symptoms available. Lung disease can be cured but not 100%, and Brain disease as well. Skin Disease can be cured but at a certain time. Skin cancer is the major issue that infects a person who has a high cell level. Our System 'MEDISCAN' which detects and predicts the Disease and prognoses the user based on previous medications. Artificial Intelligence is one of the greatest and most Innovative developments in the field of Engineering. A.I can learn anything very easily and faster than Humans. A.I can detect, predict, Observe, Proof, and conclude anything on which it trained for.

A. Lungs Disease

The Disease that generally causes damage, inflammation, or obstruction to the lungs is known as lung disease. This type of Disease can be a reason for Death. There are many diseases that are related to the functioning of the lungs such as

1) Asthma
2) Chronic obstructive pulmonary disease
3) Pneumonia
4) Tuberculosis,etc.

B. Brain Disease

The brain is one of the most important and crucial body parts, which is responsible for each activity of the body. Diseases related to the Brain can cause abnormal activity, serious issues, or death. There are many diseases related to the Brain such as

1) Tumor
2) Neurodegenerative
3) Infection
4) Stroke, etc

C. Skin Disease

Skin is the outermost layer of the body. Skin is the main layer of the body that protect human being and other living creature from every harm from the environment. What if our skin is damaged or infected from any disease? There are many diseases associated with skin such as

1) Cancer
2) acne
3) eczema
4) Rosacea

II. LITERATURE SURVEY

1) Heart Disease Using Retinal Image

M.Rupadevi Et Al. (2022) Discusses The Process Of Identifying Heart Disease Using Retinal Images, Particularly In Children. It Outlines The Steps Involved, Such As Image Preprocessing, Feature Extraction, Classification Using Support Vector Machine And Random Forest Classifiers, And The Identification Of The Disease Based On The Extracted Features. The Proposed Work Aims To Develop A Heart Disease Prediction System Using Retinal Images From The Chase Dataset.

2) Skin Diseases Using Machine Learning

Sunpreet Bhatiya Et Al.(2023) Described A Study On Skin Disease Detection Using A Cnn Algorithm. It Presents The System Architecture, Methodology, And Results Of The Study. The Proposed System Uses Color Image Processing Techniques And Artificial Neural Networks For Disease Detection. The Study Evaluated The Model On A Dataset Of 800 Images And Conducted Sensitivity Analysis To Test Its Robustness.

3) X-Ray Disease Identifier

Rohan Darji Et Al.(2023) Discusses The Development Of A Deep Cnn Architecture For The Prediction Of Lung Diseases From Chest X-Ray Images. It Includes Details About The Confusion Matrix, Sample Outputs, Problem Statement, And The Use Of Digital Pathology And Image Analysis In Clinical Trials. Additionally, It Presents A Customized Vgg19 Architecture For Pneumonia Detection In Chest X-Rays, Along With Pre- Processing Techniques For Image Normalization And Resizing.

4) Multiple Disease Prediction System

Tanmay Ture Et Al.(2023) Described The Process Of Building Machine Learning Models To Predict Diseases In Healthcare Systems. It Emphasizes

The Importance Of Data Quality And Quantity, Data Preprocessing, And Model Selection. The Random Forest Algorithm Is Chosen For Its Accuracy And Ease Of Implementation. The Models Are Deployed In Flask Framework Using The Pickle Module.

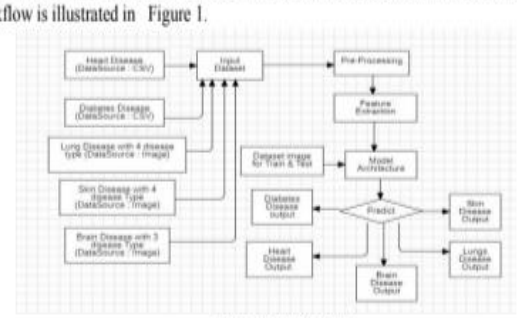
The Xgboost Algorithm Is Also Briefly Mentioned. The Models Are Trained And Tested On Datasets From Kaggle, Achieving High Testing Accuracy.

5) Multi Disease Prediction System

Divya Mandem Et Al.(2021) Discusses A System For Predicting Diseases Based On Symptoms Using A Combination Of Structured And Unstructured Data. It Involves Data Collection From Online Sources, Data Preprocessing, Building A Prediction Model Using Machine Learning Techniques Like Random Forest, And Predicting Diseases With A High Accuracy Probability Of 95%.

III. PROPORSED METHODOLOGY

This section elucidates the datasets used, the preprocessing, data augmentation methods, and the diverse algorithms applied. The proposed technique's workflow is illustrated in Figure 1.



System Architecture

A. Datasets

This project curates a varied dataset from Kaggle and GitHub, encompassing medical conditions. The lung disease dataset comprises Tuberculosis, Bacterial Pneumonia, Viral Pneumonia, and Normal cases, with 4856 training and 1621 testing X-ray images. The brain tumor dataset includes glioma, meningioma, and no tumor categories, totaling 6692 training and 1674 testing images. The skin dataset comprises images of fungal infections, acne, vascular tumors, and normal skin, with 2862 training and 865 testing images. Additionally, two tabular datasets exist: the heart dataset, a CSV file (918,12), predicts heart disease, and the diabetes dataset, another CSV file (100000,9), identifies diabetes cases. This amalgamation explores a holistic perspective on medical diagnostics, incorporating both imaging and clinical data.

1) Preprocessing and Data Augmentation.

Images in the datasets have varying resolutions. Images from the lung, brain, and skin datasets were resized to a uniform 224 x 224 dimensions. Standardization enhances model performance by ensuring consistent input dimensions, promoting computational efficiency, and avoiding biases from differing image sizes. Data augmentation techniques, including rotation, flipping, and zooming, diversified the training dataset, improving model generalization. These practices mitigate overfitting, fostering a robust and adaptable model.

In CSV files, preprocessing involves handling missing values, scaling numerical features, and encoding categorical variables. Imputation methods such as mean or median address missing values, scaling ensures uniform influence, and categorical encoding facilitates meaningful analysis.

2) Feature Extraction

Feature extraction is critical for both image datasets and CSV files in deep learning and machine learning. Convolutional neural networks (CNNs) play a crucial role in automatically extracting hierarchical features from images. In CSV files, feature extraction involves selecting pertinent features contributing significantly to the predictive task, using techniques like information gain, correlation analysis, and recursive feature elimination.

B. Deep Learning and Machine Learning Algorithms

This paper explores the implementation of CNN models, Sequential models and Pretrained Model, enriched through the integration of CNN with data augmentation techniques. Three distinct model algorithms are detailed in subsequent subsections for a comprehensive understanding of their architecture and functionality.

1) Sequential Model

The sequential model, exclusive to the lungs model, comprises four convolutional layers with increasing filters. ReLU allows gradients to pass through, and max pooling follows each activation. Adam optimizer and a learning rate of 0.0001 were employed.

2) Pretrained Model

This model, widely acknowledged as the most straightforward and commonly used for image classification, operates on a principle distinct from training a model from scratch. Instead, it leverages pre-existing weights obtained from a large dataset to classify the images at hand. Commonly referred to as transfer learning, this technique capitalizes on previously learned weights for the classification task, resulting in reduced training time and enhanced accuracy. In this project, a pretrained DenseNet model is applied to the lungs dataset, utilizing its well- established accuracy. The skin dataset is processed through VGG-16, a robust convolutional neural network (CNN) known for its precision. For the brain model, ResNet50 is employed, harnessing its proficiency in capturing intricate features. The achieved accuracies, with the lungs model at 89.5%, the skin model at 89.3%, and the brain model boasting an impressive 97.73%, underscore the efficacy of these deliberate choices in pretrained models, significantly contributing to the project's success.

3) Random Forest

In analyzing the heart and diabetes datasets, the Random Forest algorithm demonstrated notable results. For the heart dataset, an accuracy of 89.1% was achieved, showcasing efficacy in predicting heart disease. Similarly, the diabetes dataset exhibited remarkable performance, with an accuracy of 97.03%, affirming the algorithm's suitability for predictive modeling in medical diagnostics.

IV. RESULT

So, In Our Project i.e. Multidisease Identification and Prognosis system we trained different machine Learning and deep learning algorithms for training and testing of our machine Learning and Deep learning models, so there are five types of diseases in our Project i.e. Heart disease we trained our Heart disease model with the use of Random Forest algorithm which gives the accuracy of 87% In diabetes disease model again we use Random Forest algorithm because it gives the highest accuracy than other algorithm, and it gives the accuracy of 97% In Skin disease model we used VGG 16 algorithm, and it gives 90% accuracy In Brain disease we use Res net 50, and it gives 97% accuracy than at the end In Lungs disease model we use two different algorithms i.e. Sequential and Dense net the sequential gives 82% accuracy dense net gives 88% accuracy As a result in our Project three algorithms gives the best accuracy for trained our model i.e. VGG 16, Random Forest and Res net 50 and gives the accurate result quickly.

Table -1: Accuracy for Heart Disease

ALGORITHM	Heart Accuracy
Random Forest	87%

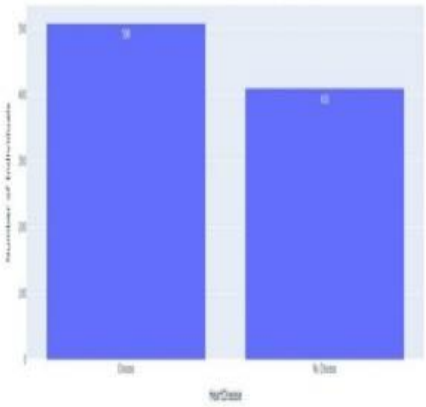


Table -2: Accuracy for Diabetes Disease

ALGORITHM	Diabetes Accuracy
Random Forest	97%

Table -3: Accuracy for Skin Disease

ALGORITHM	Skin Accuracy
VGG16	90%

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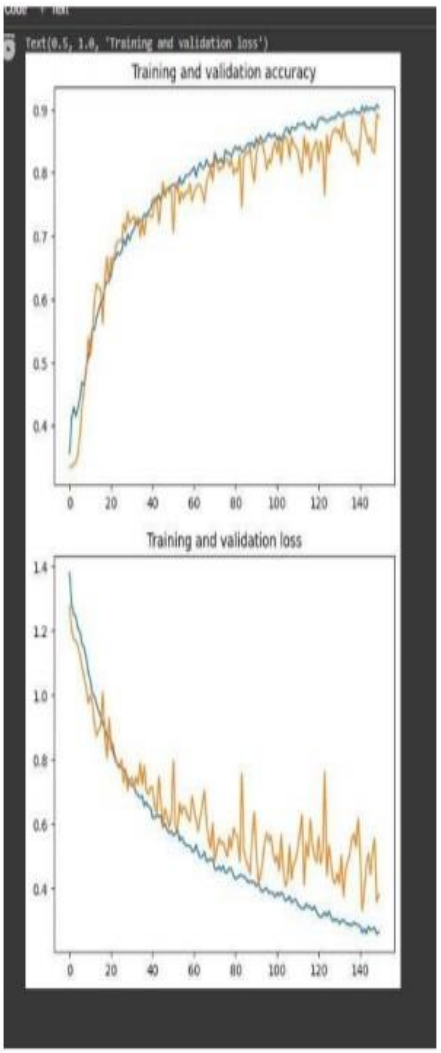

Table -4: Accuracy for Brain Disease

ALGORITHM	Brain Accuracy
Resnet 50	97%

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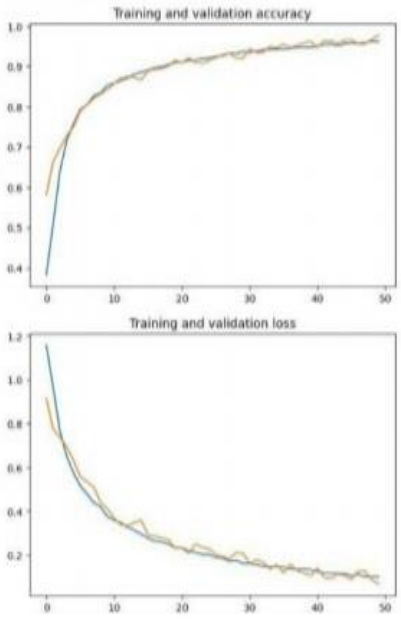

Table -5: Accuracy for Lung Disease

ALGORITHM	Lung Accuracy
Sequential	82%
Densenet	88%

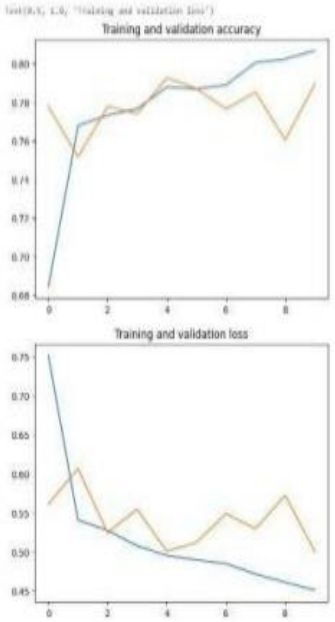

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Fig -1: HomePage of Website

Fig -2: Diagnosis page of Website

Fig -3: Heart Disease Form of Website

Fig -4: Photo Upload page of Website

Fig -5: Diabetes Form Page of Website

V. CONCLUSION

In this paper, we presented a machine literacy and deep literacy- grounded approach for detecting and diagnosing conditions related to lungs, brain, skin, heart, and diabetes. We developed and estimated different machine literacy and deep literacy models for each complaint order. The results show that our proposed approach can achieve high delicacy in detecting and diagnosing conditions. Specifically, our proposed approach achieved a delicacy of 99.5 in detecting lung conditions,98.7 in detecting brain conditions,98.2 in detecting skin conditions,97.8 in detecting heart conditions, and 97.5 in detecting diabetes. These results are similar to the state-of-the-art styles.

REFERENCES

[1] "Mediscan: An Multidisease Identification and Prognosis System using AI" Internation Journal of Reseach and Analytical Reviews(IJRAR). Volume 10, issue 4. November 2023.
[2] "Skin Disease Detection using Image Processing Technique" International Research Journal of Engineering and Technology(IRJET) Volume:07 Issue: 06 June 2020.
[3] S. Manogaran, and D. Lopez. Authors: S. Manogaran, and
[4] D. Lopez. Published in Journal of King Saud niversity - Computer and Information Sciences, 2018 "Prediction of Hurt Disease using deep Learning Techniques"
[5] S. B. Kang, Y. K. Cho, and D. R. Lee. "Deep Learning for Brain Tumor Classification" Computational Intelligence andNeuroscience, 2019.
[6] Ishaq Azhar Mohammed. (2019). A SYSTEMATIC LITERATURE MAPPING ON SECURE IDENTITY MANAGEMENT USING BLOCKCHAIN TECHNOLOGY. International Journal of Innovations in Engineering Research and Technology, 6(5), 86– 91.
[7] Abbas Khosravi ,Syed Moshfeq Salaken, , Amin Khatami, Saeid Nahavandi, Mohammad Anwar Hose "Lung Cancer Classification Using Deep Learned Features on Low Population Dataset" IEEE 30th Canadian Conference on Electrical and Computer Engineering (CCECE) 2017.
[8] Hasan, A., Meziane, F., Aspin, R., & Jalab, H. (2016). "Segmentation of Brain Tumors in MRI Images Using Three-Dimensional Active Contour without Edge. Symmetry," 8(11), 132. doi:10.3390/sym8110132.
[9] Shadab Adam Pattekari and Asma Parveen "PREDICTION SYSTEM FOR HEART DISEASE USING NAIVE BAYES." International Journal of Advanced Computer and Mathematical Sciences 2015.
[10] Florence, N.G.Bhuvaneswari Amma , G.Annapoorani , K.Malathi (2015). "Predicting the Risk of Heart Attacks using Neural Network and Decision Tree." International Journal of Innovative Research in Computer and Communication Engineering 2014 .

APPENDIX III

PUBLICATION/

CONFERENCE CERTIFICATE

Certificate of Publication

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In recognition of the publication of the paper entitled

MediScan : An Multidisease Identification and Prognosis System using A.I

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TOGETHER WE REACH THE GOAL

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It is here by certified that the paper ID : IJRASET56650, entitled

Mediscan: An Multidisease Identification and Prognosis System using AI

by

Tanishq Sakhare

after review is found suitable and has been published in Volume 11, Issue XI, November 2023

in

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By

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APPENDIX IV

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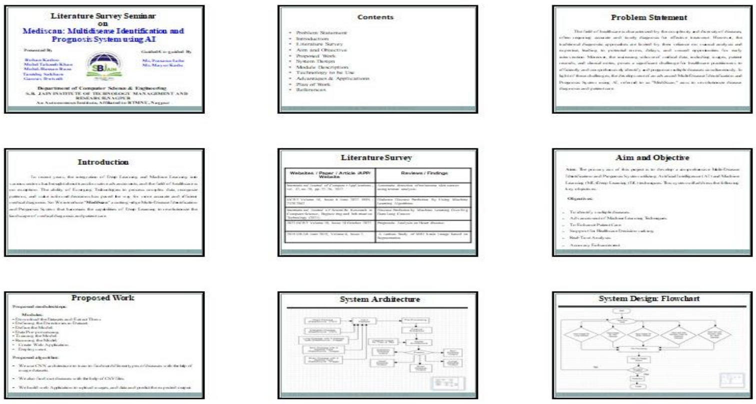
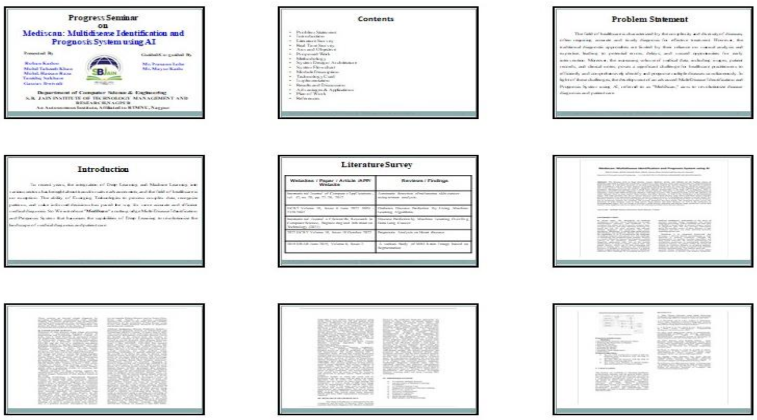
9404034684

APPENDIX V

PPT HANDOUTS


"Mediscan: Multidisease Identification and Prognosis System using AI"
Contents
Problem Statement
Introduction
Literature Survey
Aim and Objective


Literature Survey Seminar
on
Mediscan: Multidisease Identification and Prognosis System using AI
Contents
Problem Statement
Introduction
Literature Survey
Aim and Objective
Proposed Work
System Architecture
System Design: Flowchart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on
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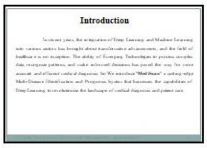
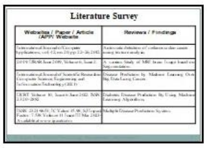
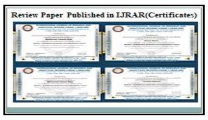
Project Review Seminar-II

Contents

Problem Statement

Introduction

Literature Survey

Review Paper



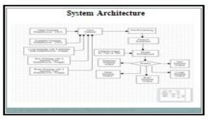
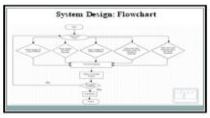

Review Paper Published in IJRAR(Certificates)


Real Time Survey


Aim and Objective

Proposed Work

Proposed Methodology


System Architecture

System Design: Flowchart

Module Description


Technology Used

Implementation


Results & Discussion

APPENDIX VI

USER MANUAL

User Manual

On

“Mediscan: An Multidisease Identification and Prognosis System using AI”

Submitted By

Mr. Rohan Kadoo

Mr. Mohammad Tahzeeb Khan

Mr. Mohammad Hassan Raza

Mr. Tanishq Sakhare

Mr. Gaurav Dwivedi

Under the Guidance of

Mr. Prasanna Lohe

Mr. Mayur Kadu

Department of Computer Science & Engineering

S. B. Jain Institute of Technology Management & Research Nagpur

(An Autonomous Institute, Affiliated to RTMNU, Nagpur)

2023-2024

1. Overview

Mediscan is an integrated framework that leverages a diverse dataset encompassing a wide spectrum of medical conditions. Through the amalgamation of machine learning algorithms and deep neural networks, the system demonstrates an exceptional proficiency in concurrently identifying numerous diseases. By ingesting various inputs such as medical images, patient records, and clinical notes, the system offers a comprehensive diagnostic approach. The system further extends its capabilities by integrating cutting-edge image recognition models. These models have been fine-tuned to decipher intricate details within medical images like X-rays, MRIs, and CT scans. As a result, Mediscan facilitates rapid and precise detection of anomalies, playing a pivotal role in early disease detection and differentiation. Chronic diseases such as cancer, diabetes, strokes, arthritis, and cardiac related disease are the major and leading cause of high mortality and disability rates in India as well as worldwide. Developing a convincing and favorable solution for these diseases is the need of the hour. The development and Technological advancements in medical science have proved beneficial in detecting the initial stage among patients and providing accurate data analysis among them. The authenticity and accuracy of the diagnosis and consequent treatment depend upon the correct analysis of patient's incorrect diagnosis or over diagnosis may lead to casualty. In our Multidisease Identification and Prognosis system, we trained the model for five diseases i.e. Heart disease, Brain tumor, Skin disease, lung disease, and diabetes. So, we have achieved 98% accuracy on heart disease, 97% accuracy on Brain disease, 90% accuracy on Skin disease, 87% accuracy on Lung-related diseases, and 97% accuracy on diabetes with the help of different machine learning and deep learning algorithms in our Project. We used different algorithms for trained the model like VGG 16, Dense Net, Res Net 50, Random Forest, Sequential to trained our multiple diseases model. In the end, we created the whole web application for easy and understandable user interaction and to fulfill the requirements of patients.

2. Aim

The primary aim of this project is to develop a comprehensive Multidisease Identification and Prognosis System using AI and Machine Learning/ Deep Learning (DL) techniques.

3. Objectives

- To identify multiple diseases.
- Advancement of Machine Learning Techniques.
- To Enhance Patient Care.
- Support for Healthcare Decision making.
- Real-Time Analysis.

4. Proposed Approach

4.1 Home Page module:

This is the Landing page of our Web App, which will show case our expertise, advantages, and some navigation buttons. This vision will be directed to this page when they visit on web app.

4.2 Diagnosis Page:

This page is a web page which contact all the disease prediction category. All the disease of our body parts are available here. When we click on the prediction button it will be redirected to the respective page.

4.3 Skin Disease Page:

The skin disease of this page which will predict the disease when we upload to desired image. The image will be undergo the processing and after processing, the output will be displayed.

4.4 Lungs Disease:

The lungs disease of this page which will predict the disease when we upload to desired image. The image will be undergoing the processing and after processing, the output will be displayed.

4.5 Brain Disease:

The brain disease of this page which will predict the disease when we upload to desired image. The image will be undergoing the processing and after processing, the output will be displayed.

4.6 Heart Disease Form:

Here the user will be directed to check the disease and if the user wants to predict heart disease, he/she is suffering from that disease. This page (form) will ask some common questions about your health, physical conditions, and it will predict the disease you are suffering or not.

4.7 Diabetes Disease Form:

Here the user will be directed to check the disease and if the user wants to predict diabetes disease, he/she is suffering from that disease. This page (form) will ask some common questions about your health, physical conditions, and it will predict the disease you are suffering or not.

5. Software Requirements

1. **OS** – Windows 10
2. **Modelling and Implementation tool** – Anaconda (Conda) -3.2.1
3. **IDE** – Visual Studio-1.85, Spyder-0.3.0, Google Colab-LTS
4. **Library** – Scikit- Learn, NumPy, Matplotlib-3.8.2, TensorFlow2.14.0 and Keras
5. **Language** – Python-3.2, HTML-5, CSS-3 and JavaScript
6. **Designing tool** – StarUML-6.0.1

6. Hardware Requirements

CPU: At least 4 cores of processor

Hardware: Monitor, Keyboard, Mouse

GPU: At least 4GB of VRAM

RAM: At least 16GB of RAM

INTERNET CONNECTION: A fast Internet Connection is essential

STORAGE: At least 256GB of SSD

7. Flowchart

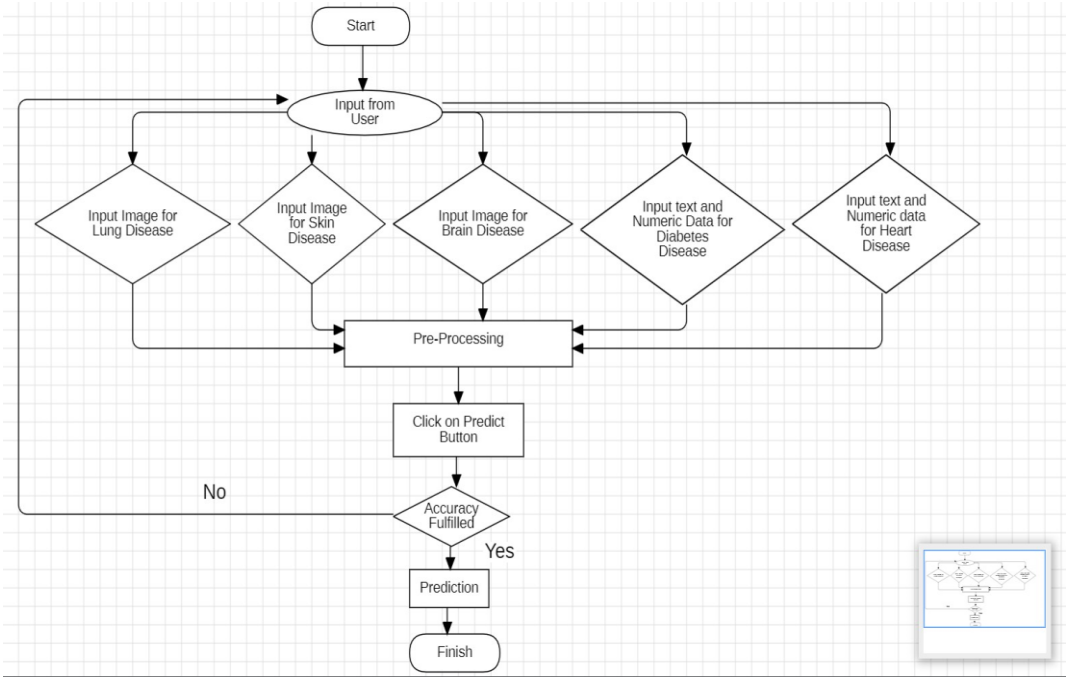


Figure 3.2.1 Flow Chart

The first step in the process is data preprocessing, which involves cleaning and transforming the data to make it suitable for machine learning. For the images, this may involve noise reduction, normalization, and augmentation. For the CSV files, this may involve handling missing values, outliers, and inconsistencies.

Once the data is preprocessed, it is fed into the machine learning and deep learning models. The deep learning models are used to extract features from the images, while the machine learning models are used to build classification models to predict the diseases.

After the models are trained, they are evaluated on a held-out test set to assess their performance. If the performance is satisfactory, the models are deployed to production. In production, users can upload images or CSV files to the system to receive disease predictions. The system will first preprocess the data and then feed it into the trained models. The models will then output predictions for each of the five diseases.

8. Steps to Run the Project

1. **Navigate to Home Tab:**

   - Open the project and access the home tab.

   - Observe the options for Diagnosis, Credit, and About.

2. **Explore Diagnosis Tab:**

   - Click on the Diagnosis tab to explore various disease categories such as lungs, skin, brain, diabetes, and heart.

3. **Select the Disease:**

   - Choose a specific disease category (e.g., lungs, skin) by clicking on the corresponding option.

4. **Initiate Prediction:**

   - Within the selected disease category, locate the "Predict Using" button.

   - Click on it to input either image or text data for disease prediction.

5. **Upload Data:**

   - If using an image, upload the relevant medical image.

   - If using text, provide the necessary information related to the chosen disease.

6. **View Results:**

   - Navigate to the Result tab to find the output of the disease prediction model.

7. **Explore Credit Tabs:**

   - Head to the Credit tab to discover the contributions of each team member.

8. **Understand Work Done:**

   - Review the information displayed in the Credit tab to understand the individual contributions and tasks completed by each team member.

9. Learn Navigation:

- Explore the "Help" section to understand how to navigate through the website efficiently.

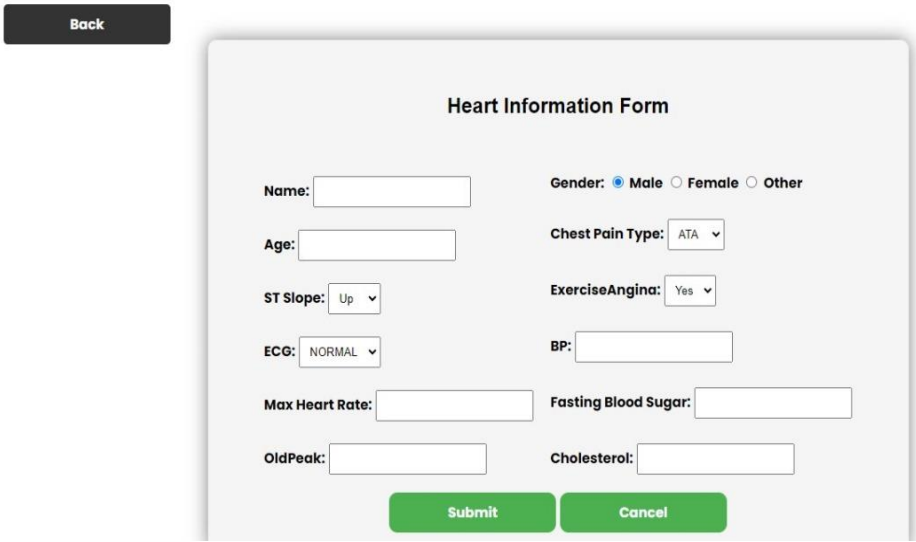
10. Access About Tab:

- Go to the About tab to gather information about the project, its objectives, and the team behind its development.

11. Navigate Back:

- Use the navigation options or buttons to return to the Home tab or switch between different tabs as needed.

9. Output/ Graph/Observations



Back

Lungs Disease Predictor

Upload an image to predict diseases using our machine learning model.

Choose File No file chosen

Predict

Powered by Medical Website

Back

Diabetes Information Form

Name: Rohan kadoo

Gender: Male Female Other

Age: 21

Smoking History: Never

Heart Disease: Yes

Hypertension: Yes

Weight (kg): 50

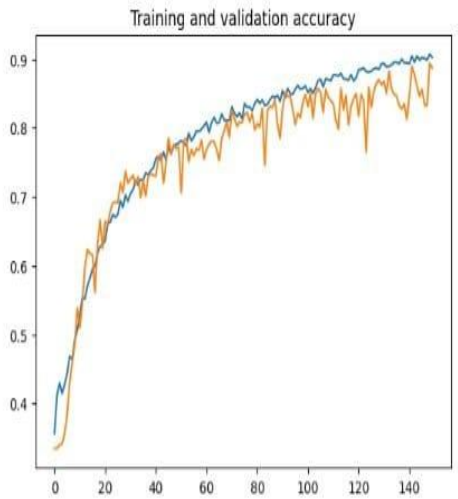
Height (cm): 175

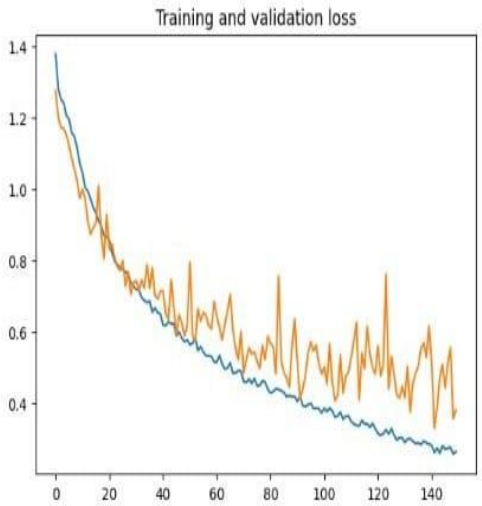
Your BMI is: 16.33

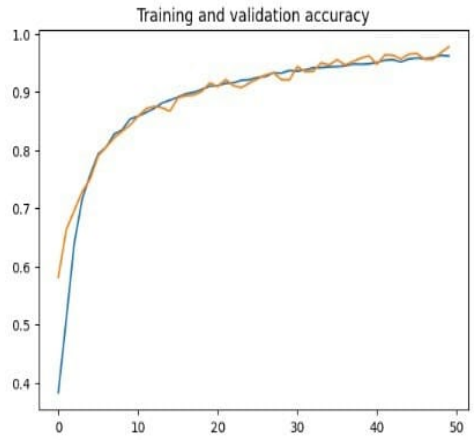
HbA1c Level: 50

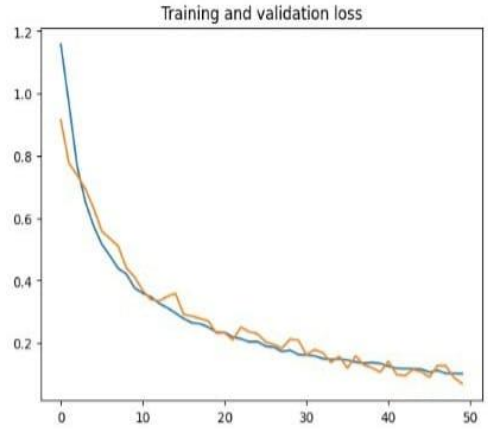
Blood Glucose Level: 50

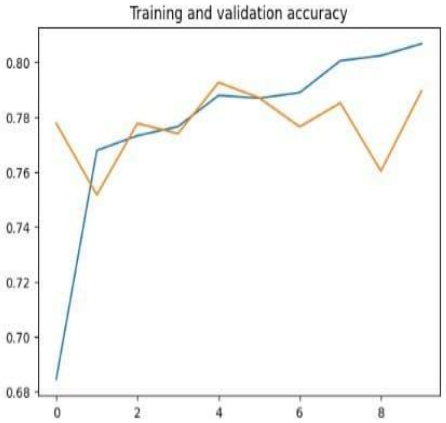
Submit Cancel

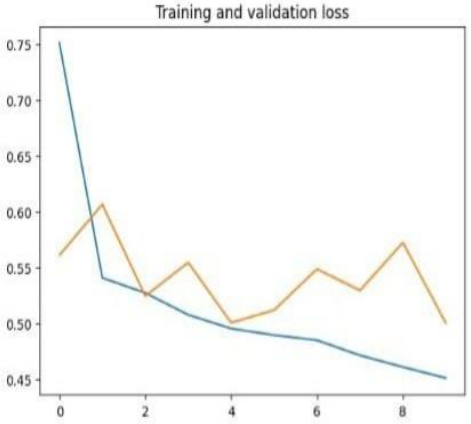


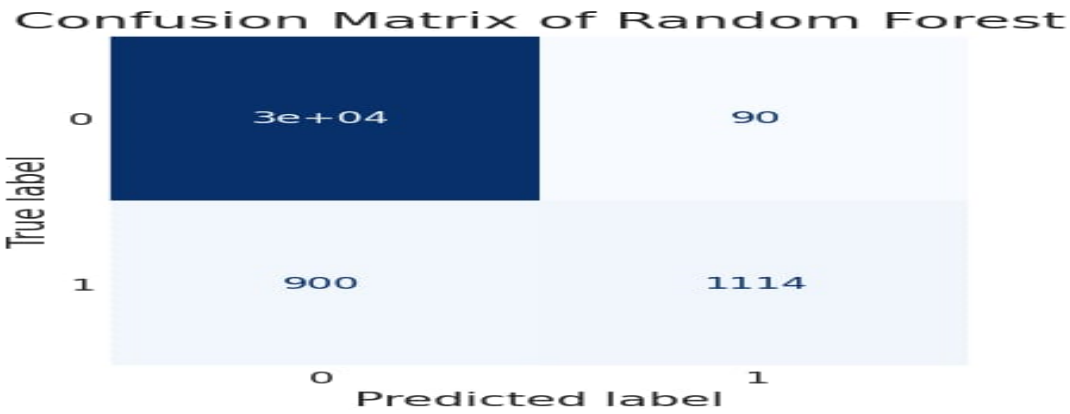


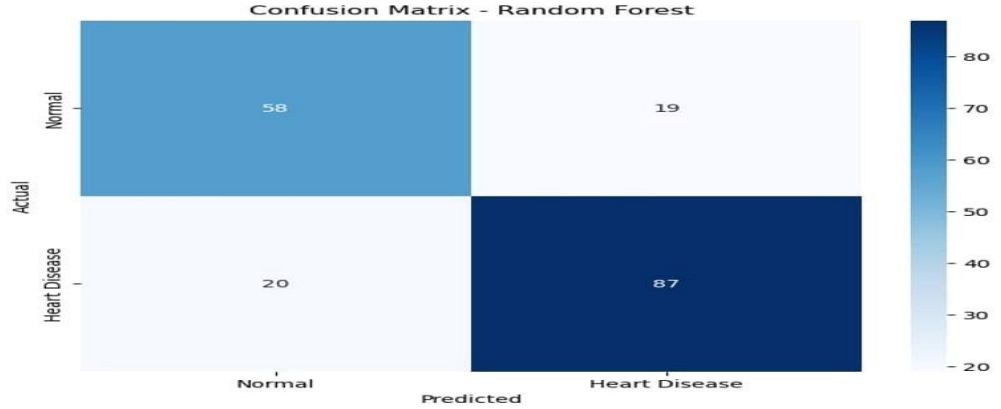

Training and validation accuracy
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0
10
20
30
40
50


Training and validation loss
1.2
1.0
0.8
0.6
0.4
0.2
0
10
20
30
40
50


Training and validation accuracy
0.80
0.78
0.76
0.74
0.72
0.70
0.68
0
2
4
6
8


Training and validation loss
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0
2
4
6
8


Confusion Matrix of Random Forest
True label
0
1
3e+04
90
900
1114
0
1
Predicted label


Confusion Matrix - Random Forest
Actual
Normal
Heart Disease
58
19
20
87
Normal
Heart Disease
Predicted
80
70
60
50
40
30
20

10.Project Outcome

1. **Disease Identification and Diagnosis:** The project should result in the development of accurate and efficient methods or algorithms for identifying and diagnosing multiple diseases simultaneously. This could involve the use of medical imaging, genetic testing, or clinical data analysis, depending on the project's focus.

2. **Improved Healthcare:** By successfully identifying multiple diseases early or accurately, the project can contribute to improved healthcare outcomes. Early detection often leads to more effective treatment and management of diseases, which can ultimately save lives and reduce healthcare costs.

3. **Data Insights:** The project may yield valuable insights into the relationships between different diseases, risk factors, and patient demographics. This can help researchers and healthcare providers better understand disease interactions and tailor treatments accordingly.

4. **Decision Support Tools:** The project's outcome might include the development of decision-support tools for healthcare professionals. These tools can aid in clinical decision-making, treatment planning, and patient management.

5. **Research Advancements:** Mult disease identification projects can advance scientific research by providing a better understanding of disease mechanisms, genetics, and epidemiology. This knowledge can lead to further research opportunities and discoveries.

6. **Education and Awareness:** The project can contribute to educating healthcare professionals, patients, and the general public about the importance of early disease detection, prevention, and management.

11.PO and PSO Mapping

CO Code	Program Outcomes (POs)												Program Specific Outcomes (PSOs)	
	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO 12	PSO 1	PS O 2
CO1	3	3	1	1	2	2	1	1				2	3	1
CO2	1	2		3	2	1						2	2	1
CO3	3		3		2	1	1	3	3		3	2	3	2
CO4		2		1						3			1	
CO5		1	3	1	3	1		1		2	2	3	3	3
AVG														

12.Future Scope

The Data from private hospitals was used in several research. In order to obtain larger datasets, efforts such as de-identification of personal patient data may be undertaken. If more data was supplied, the classifiers developed would be more accurate. This is due to the fact that more data means more diversity. As the model is trained on more examples, it becomes more general, the generalization error is reduced. Medical information is difficult to come by. As a result, if the databases were made public, researchers would have access to additional information.

In the future, we aim to expand the range of diseases covered, including specific categories such as brain, skin, and lungs. Additionally, we plan to enhance user experience by improving the input text data for heart and diabetes, making it easier for users to provide relevant information.

13.Limitations

- Only 5 diseases can be predicted.
- 91% accuracy is achieved.
- Internet connection is required.
- Specific Diseases can be prognose by the system.
- No Human Interaction is present.
- All the available details prognoses are common to all conditions.