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A Review Paper on the Use of AI in Early Diagnosis and Prognosis of Human Diseases

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Abstract: *The project Advanced AI-driven Solution for Human Diseases Management focuses on diagnosing and managing chronic diseases like diabetes, heart disease, and kidney disease. These diseases can be life-threatening if not diagnosed early, and current systems for disease management often lack efficiency and accuracy. By employing advanced machine learning algorithms such as Logistic Regression, Decision Trees, and Random Forest, the platform offers improved predictive accuracy for these diseases. The system integrates a user-friendly interface, allowing individuals to input their health data, and provides real-time prediction results with automated email notifications and PDF reports. The results of this platform demonstrate an improved diagnostic process, helping users make informed decisions about their health. Index Terms-disease prediction, AI in healthcare, diabetes, heart disease, kidney disease, machine learning, Logistic Regression, Random Forest, health automation, disease management system.*

Keywords: Heart Disease, Diabetes, Kidney disease, Machine learning, Logistic Regression, Decision Trees, Random Forest, Health automation, Disease management system, Predictive accuracy, Real-time prediction

I. INTRODUCTION

The prevalence of non-communicable diseases (NCDs) such as diabetes, kidney disease, and heart disease is increasing due to many factors such as increasing life expectancy, decreasing premature deaths, and increasing prevention risk [19]. Machine learning techniques to predict disease using symptoms and patient history have been researched for decades. Machine learning technology provides a unique platform for solving health problems in healthcare. We use machine learning to collect complete hospital information [18]. The main organ is the heart, its main function is to transport blood throughout the body, but threats to the heart can cause health problems. Cardiovascular diseases (CVD) are one of the causes of heart disease in today's world. Every year, 17.9 million people die from some cause related to CVD, which accounts for an estimated total of 32 deaths worldwide [1]. Diabetic nephropathy (DKD) is a complication of diabetes. The prevalence of DKD in my country is around 20-40 and has become the second leading cause of kidney disease in my country, affecting the quality of life of people with diabetes [2]. If it does not work properly, it can cause serious health problems [3]. Diabetic nephropathy (DKD) is the leading cause of end-stage renal disease (ESRD) [15]. The severity of human heart disease is determined by various data mining and neural network methods. Decision trees, genetic algorithms, naive Bayes, K-nearest neighbor algorithms, etc. Failure to do so will reduce the body's efficiency or cause premature death. Use clinical and raw data mining to identify various metabolic diseases. Classification data mining technology plays an important role in cardiovascular disease prediction and data science [09]. The emergence of artificial intelligence (AI) enables computers to see, think, and act in intelligent ways like humans. ML algorithms use a variety of optimization, statistical, and processing methods, learning from experience-generated knowledge and sending it to the decision was good. [20].

II. OBJECTIVES

- To identify action in input Image or video dataset.
- To recognize abnormal behaviour in Image or video dataset.

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- To study and analysis of deep learning models for abnormal behaviour detection.
- To detect abnormal behaviour using deep Learning technique

III. LITERATUREREFERENCES

Our body uses two methods to detect and diagnose heart disease, kidney disease, and diabetes. The patient entered via text. All the data used to show this comes from places like Kaggle, UCI, and what was happening at the time. Collect and organize information: The hospital provides medical information to patients, including their age, blood pressure, diabetes, and other information. [7]. Model training, in this step the data needs to be analyzed in the best way and represented in the form of a model. The cleaning data is divided into two parts: training and testing (the ratio will be changed if necessary), and the first part (training data) is used to build models. The second (test data) is guidance[18]. Evaluate the model. We research, implement and test algorithms according to our goals and we need to use our data to achieve the best results[18]. Improve performance. Therefore, the design will be efficient and adaptive to the information stored and processed [18]. This article is about machine learning-based prediction of kidney disease, heart disease and diabetes. Surprisingly, it is suitable for both categorical and continuous dependent variables. In this algorithmic approach, we usually divide the population into two or more homogeneous groups. This is done by creating as many different groups as possible using the most important attributes/participants [18]. Building a decision tree from the dataset is one of the most important steps to complete. During construction. The concept of mean entropy has been proposed for selecting which features will be important. It defines the level of purity or homogeneity of a collection of all samples. This strategy requires determining the mean entropy of each feature and selecting the feature with the lowest mean entropy value [6]. High entropy leads to poor training models and vice versa. It is necessary to increase the data as an analytical tool to estimate the quality of data related to target features and training behaviors. Entropy and information gain are very important to understand the data provided by the training model with the given behavior and to understand its good relationship for the target features. High IG and low entropy are necessary for the model to have good accuracy [1]. it is difficult to create a bad random forest due to its simplicity. This rule is also a good choice if you need to create a model in a short time. Most importantly, it will honestly represent the weight it gives you the right to choose. Random Forest is difficult to model in terms of performance [18]. The test results show that each page represents a group or a group of partitions. The random tree learning process is a type of supervised learning that works best when used in cases where the examples are represented by attribute-value pairs where the output values of the target function are included. Events are classified using a decision tree method that involves sorting the examples in ascending order from the root of the tree to the leaves [6] SVM The SVM classifier works very well in real-world situations A scenario with a unique global response contrasts with a scenario with many unique local solutions. While it is true that it is a linear classifier, it can also be used in a nonlinear setting by using a nonlinear kernel. Since SVM is a supervised classification method, it is necessary to go through the learning phase before trying to predict the behavior of an unknown example [6]. SVM classifier training: The dataset is first divided into 60:40, i.e. 60 data are used to train the learning model and 40 data are used for testing. After evaluating the performance, it was determined that the accuracy of the model was 70. To increase the accuracy of the prepared model, the data was divided into 80: 20, 80 of the data were used for training. support vector machine and 20 of the data were used for testing. the model. After testing the model, the accuracy reached 80[8]. ¿ Design and evaluation of the model. (EHR), laboratory information systems or other data sources. The information collected includes demographic information, medical history and test results such as blood creatinine, blood urea nitrogen (BUN) and estimated glomerular filtration rate (eGFR). Preprocessing: After the data is collected, it needs to be preprocessed to make sure that it is good and suitable for machine learning algorithms. These steps include data cleaning, handling missing values, and detecting vulnerabilities. Feature Selection Techniques such as statistical methods or machine learning algorithms such as Recursive Feature Elimination (RFE) or Principal Component Analysis (PCA) are used to select the most important features [5].principal component analysis (PCA) are used to select the most important features [5].

IV. SYSTEM ARCHITECTURE

In our system architecture firstly we will gather the dataset for three diseases namely diabetes, heart, and kidney, next we will create and train machine learning models using the gather dataset and various python libraries and

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we will save that models as a pickle file and will load that saved models in the python library named streamlit for creation of web application. User will start that application and perform authentication process using email id and input health data based upon the entered data the application will predict the disease and generate results. The predicted result will also be sent to the user through their registered email.

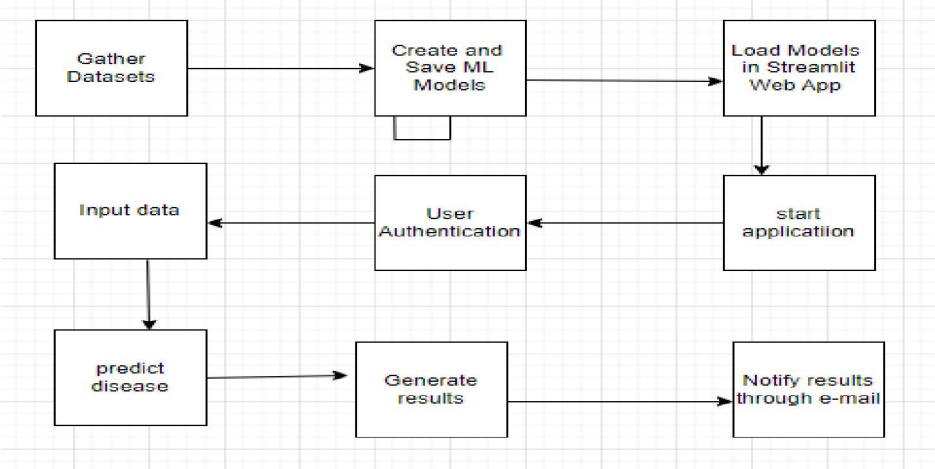

Figure1.System Architecture

V. APPLICATIONS

- The system can predict chronic diseases like diabetes, heart disease, and kidney disease at an early stage, enabling timely medical interventions.
- The web-based interface makes it easy for users, including those in remote or underserved areas, to access health predictions and precautions without needing to visit a hospital or clinic.
- People in remote or underserved areas can use this system to access diagnostic tools and get advice without needing to visit a healthcare facility.

VI. ADVANTAGES

- By utilizing machine learning algorithms, the system allows for the early detection of chronic diseases like diabetes, heart disease, and kidney disease, giving users a better chance for timely medical intervention.
- The main drawback is that the low-level image properties were insufficient to capture the essence of abnormalbehavior. A more advanced approach which was to build hierarchy models with specific features based on thedomainknowledge.
- The app provides personalized health advice, which includes both allopathic and Ayurvedic precautions, making it more comprehensive and tailored to individual needs.

VII. CONCLUSION

In conclusion, the ”Advanced AI-Driven Solution for Human Diseases Management” project aims to significantly enhance healthcare accessibility and personalization. By utilizing advanced machine learning algorithms to predict chronic diseases such as diabetes, heart disease, and kidney disease, the application not only empowers users with timely health insights but also provides personalized recommendations for managing their conditions. The project addresses critical issues such as early detection and user engagement, making health management more proactive rather than reactive. With the integration of automated reporting and communication features, the application fosters a supportive environment for users, encouraging them to take charge of their health. Overall, this initiative represents a crucial step towards improving public health out comes through technology and innovation.

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