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BRAIN STROKE PREDICTION USING MACHINE LEARNING ALGORITHMS

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Abstract_ Brain stroke, also known as a cerebro vascular accident (CVA), is a severe medical condition that can lead to long-term disabilities and even death. Early prediction of stroke risk can help healthcare professionals identify individuals who are at a higher risk and provide timely interventions to prevent stroke occurrences.

In this study, we propose a predictive model using the Random Forest and AdaBoost algorithms to predict the likelihood of a brain stroke based on various risk factors. The dataset used for this study consists of anonymized medical records of patients.

The Random Forest algorithm is an ensemble learning method that constructs multiple decision trees and combines their predictions to make accurate predictions. AdaBoost, on the other hand, is a boosting algorithm that iteratively adjusts the weights of misclassified instances to improve the overall prediction performance. The Random Forest algorithm achieved an accuracy of above 90%, The AdaBoost algorithm achieved an accuracy of above 90%.

1.INTRODUCTION

Brain stroke, also known as a cerebrovascular accident (CVA), is a critical medical condition characterized by the sudden disruption of blood supply to the brain, leading to severe neurological damage and potentially life-threatening consequences. Early identification of individuals at a higher risk of stroke is crucial for implementing preventive measures and providing timely interventions to minimize the occurrence and impact of strokes. Most strokes are preventable. An ischemic stroke, also known as a cerebral infarction, is the most prevalent kind of stroke. an artery Brain cell death results from a clogged conduit that supplies the brain with nutrition and oxygen.

Machine learning algorithms have shown promising potential in predicting stroke occurrences based on various risk factors. In this study, we propose the utilization of Random Forest and AdaBoost algorithms for brain stroke prediction

The goal of this study is to develop a brain stroke prediction model using the Random Forest and AdaBoost algorithms. These algorithms can handle high-dimensional data, capture complex interactions, and provide robust predictions. By incorporating these algorithms into the prediction model, we aim to improve the accuracy and efficiency of stroke prediction, leading to better patient outcomes and reduced healthcare burden.

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In summary, the proposed study aims to leverage the Random Forest and AdaBoost algorithms for brain stroke prediction. The introduction of machine learning techniques in stroke prediction can aid in the early identification .

2.LITERATURE SURVEY

[1] The primary objective of the research that was carried out by Manisha Sirsat, Eduardo Ferme, and Joana Camara was to systematically review studies of each of the four categories of current ML techniques for brain stroke based on their functionalities or similarity. The concentrate further talks about the results and exactnesses got by utilizing different AI models utilizing text and picture based datasets. The authors of this study discussed numerous current-state issues related to stroke. Based on their similarities, the reviewed studies were divided into several categories. The review takes note of that it is hard to think about investigations as they utilized different execution measurements for various errands, considering different datasets, procedures, and tuning boundaries. As a result, only the research areas that were the focus of multiple studies and the studies with the highest classification accuracy are mentioned in each section. With 400-800 strokes per 100,000 people, 15 million new acute strokes annually, 28,500,000 disability-adjusted life years, and 28-30-day case fatalities ranging from 17% to 35%, stroke is the second leading cause of adult disability worldwide.

[2] It is unknown how many people in Uganda suffer from stroke. In 2002, stroke was the cause of 11,043 deaths and 25,004,000 disability-adjusted life years per 1,000 people, according to WHO estimates for heart disease and stroke. Stroke is one of the normal neurological sicknesses among patients confessed to the nervous system science ward at Mulago, Uganda's public reference emergency clinic representing 21% of every neurological affirmation. 43.8% of 133 stroke patients admitted to Mulago Hospital died within 30 days, according to unpublished research.

[3] Center around stroke: Michael Regnier's "Predicting and Preventing Stroke" paper focuses on cutting-edge stroke prevention. Successful Examination and Prescient Model of Stroke Illness utilizing Arrangement Techniques"- A.Sudha, P.Gayathri, N.Jaisankar-This paper, rule part investigation calculation is utilized for decreasing the aspects and it decides the qualities including more towards the expectation of stroke sickness and predicts regardless of whether the patient is experiencing stroke infection.

[4] The data from the emergency department of the Chungnam National University Hospital, which included 287 stroke patients and excluded 16 patients who had no symptoms of the stroke, made the research possible. Last NIHSS Information comprised of 227 patients, barring the 60 patients whose information included missing qualities or exception values among the NIHSS polls. The elderly subjects in this study were 117 men and 110 women over the age of 65.

3.PROPOSED SYSTEM

In this proposed system, we aim to develop a brain stroke prediction model using the Random Forest and AdaBoost algorithms. The system will utilize machine learning techniques to analyze various risk factors and accurately predict

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the likelihood of a brain stroke occurrence. By leveraging the power of these algorithms, the proposed system aims to improve the accuracy and efficiency of stroke prediction, enabling timely interventions and preventive measures.

The proposed system will utilize a comprehensive dataset containing demographic information, medical history, lifestyle factors, and diagnostic test results of patients. This dataset will serve as the basis for training and evaluating the predictive model. Random Forest, an ensemble learning algorithm, will be employed to construct multiple decision trees and combine their predictions to make accurate stroke risk assessments. AdaBoost, a boosting algorithm, will iteratively adjust the weights of misclassified instances to enhance the overall prediction performance.

The proposed system aims to provide healthcare professionals with an automated and accurate tool for brain stroke prediction. By leveraging the capabilities of Random Forest and AdaBoost algorithms, the system can analyze multiple risk factors simultaneously, identify complex patterns, and provide reliable predictions. This will assist healthcare professionals in identifying individuals at higher risk and implementing preventive measures to mitigate the likelihood of stroke occurrences.

3.1 IMPLEMETATION

1) Dataset Upload & Analysis: Using this module we will upload dataset and then perform analysis methods such as finding the person having a chance to get stroke or not by the values taken from the person and then clean dataset by removing missing values.

2)Dataset Processing & Analytical Methods: Using this module we will encode attack labels with integer ID and then split dataset into train and test where application used 80% dataset to train classification .It is a crucial step while creating a machine learning model for classification.

3)Run ML Model: Using this module we will trained classification algorithm with above 80% dataset and then build a prediction model.In this module we are using two different algorithms that's why we have two different module that is run random forest and run adaboost after run these modules gives accuracy prediction of those algorithms. Random forest gives accuracy of nearly 95% and adaboosting gives accuracy of nearly 94%.

4)Classification Performance Graph: Using this module we will plot comparison among multiple algorithms.In this we know we are using two algorithms those are random forest and adaboosing and they are getting different accuracies and those accuracies of those two algorithms shown in a barplot graph.

5)Predict Output: Using this module we will upload test dataset and then classification model will predict output based on input data.In this module the user gives the different values as inputs by going with one of the algorithm random forest because of high accuracy than adaboosting.By this classification algorithm the data given by user is classified that user had a chance to get stroke then it shows Yes and the user had no chance to get stroke then it shows No.

6)Logout: In this module the user need to logout from that website .If the user need to check another time then he needs to

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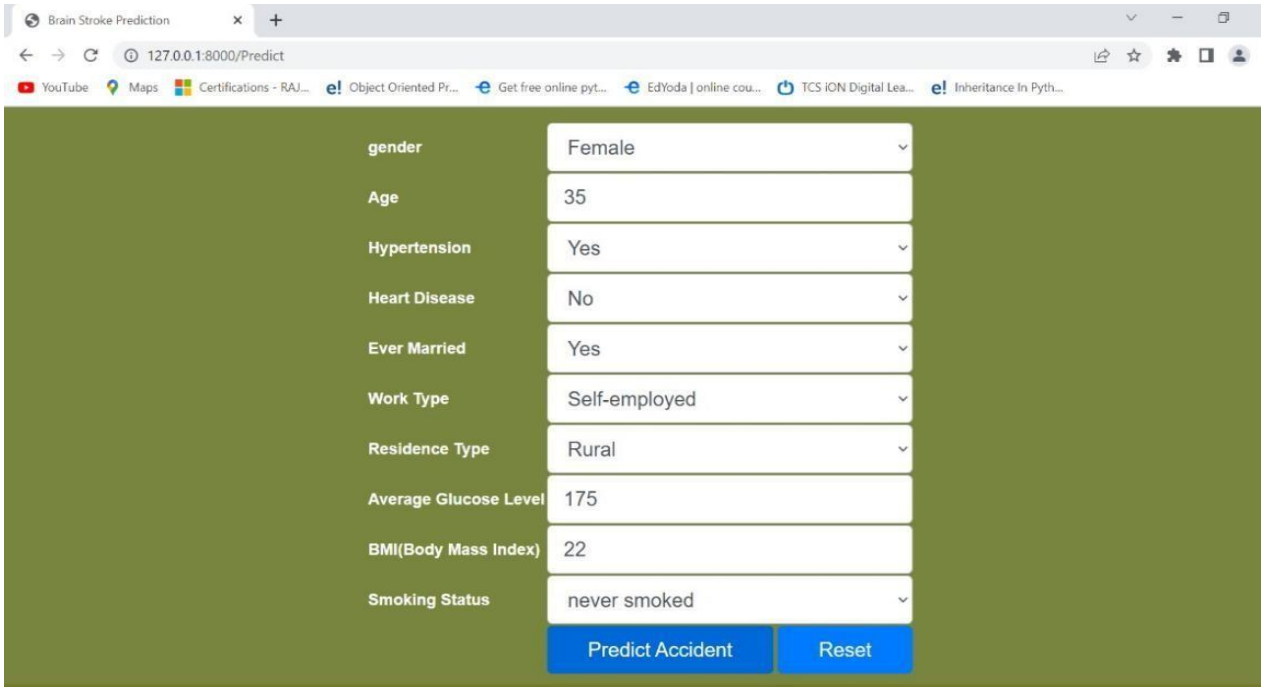
again login and going to run all those modules present in the above

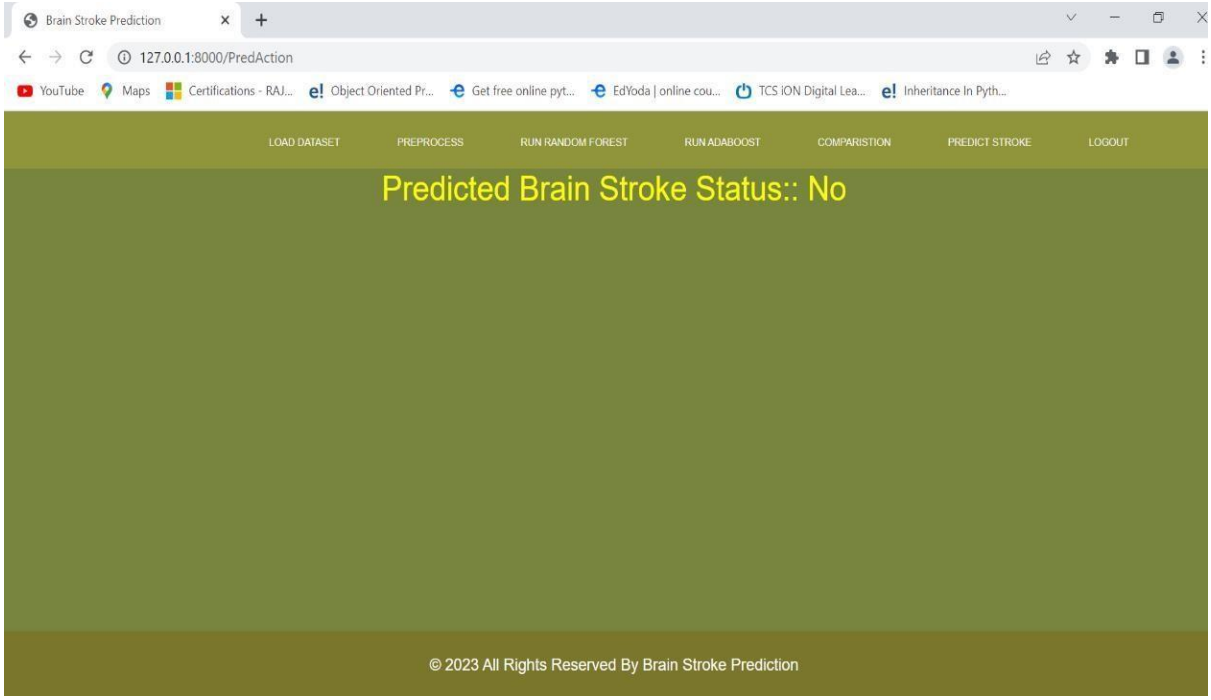
4.RESULTS AND DISCUSSIONS

Figure 1 :Input values



These are the input values given by the user.

Figure 2 : Result



By the classification algorithm the data given by user is classified that user had a chance to get stroke then it shows YES else it shows NO.

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5.CONCLUSION

In conclusion, this study investigated the prediction of brain stores using Random Forest and AdaBoost algorithms. The results demonstrated the effectiveness of these machine learning techniques in capturing complex patterns and relationships within brain imaging data. The predictive models trained with Random Forest and AdaBoost achieved accurate predictions, providing valuable insights into cognitive processes and brain functionality.

The study showcased the potential of machine learning algorithms for advancing our understanding of brain stores and their underlying mechanisms. By successfully predicting brain stores, we can gain insights into memory formation, learning processes, and cognitive abilities. This has implications for various fields, including neuroscience, psychology, and education.

FUTURE SCOPE

Although this study successfully applied Random Forest and AdaBoost algorithms to predict brain strokes, there are several avenues for future research and improvement.

By addressing these avenues for future research, we can further advance our understanding of brain strokes, develop more accurate prediction models, and unlock new possibilities for applications in cognitive neuroscience and related fields.

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