Heart Stroke Prediction

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Problem Statement

➢ The objective is to develop a machine learning model that predicts the chances of a heart stroke occurring in an individual based on various health and lifestyle factors.

➢ The goal is to assist healthcare providers in identifying high-risk individuals, allowing for early treatment and preventive measures.

➢ Heart stroke is the major cause of death worldwide, early prediction can significantly impact patients outcome by providing them early and timely medication.

➢ ML model can help the health industry in analyzing the heart stroke patterns and provide them the accurate prediction of heart stroke in an individual.

Proposed Solution

Proposed Solution for Heart Stroke Prediction Using Machine Learning

➢ Data Collection from different data set.

➢ Data Pre Processing and cleaning.

➢ Exporting the clean data.

➢ Selection of features for enhancing the model.

➢ Model Development and Evaluation.

Descriptive Analysis

Data Overview

➤ Total Records: 48510 rows x 12 columns

➤ Key Features: ID, Gender, Age, Hypertension, Heart Disease, Ever Married, Work Type, Residence Type, Average Glucose Level, BMI, Smoking Status, Stroke

Statistics:

➤ Mean, Median and standard deviation of numerical features.

➤ Data type, count of data and finding the null values.

Effect of Data Preprocessing

➢ Data preprocessing is essential for preparing a dataset for machine learning, especially in a critical application like heart stroke prediction.

➢ Effective preprocessing ensures that the data is clean, relevant, and in the right format for the model, leading to more accurate and reliable predictions.

➢ Handling missing values isnull() function.

➢ Giving the labels to the categorical column using the LabelEncoder().

➢ Changing the data types.

➢ Proper preprocessing can significantly impact model performance, accuracy.

Machine Learning Modelling

ML Algorithm used:

Supervised ML Logistic Regression.

The Successful implementation of this machine learning model will:

➢ **Risk Identification:** The model can identify individuals at high risk for heart stroke, enabling early treatments and preventive measures.

➢ **Reduced Mortality Rates:** By predicting heart stroke risk accurately, healthcare providers can take preventive actions, which can lead to lower mortality rates associated with heart strokes.

➢ **Health Policy Development:** Insights from stroke prediction models can inform public health policies and initiatives aimed at reducing stroke incidence at the population level.

Optimisation

➢ Optimizing a heart stroke prediction ML model involves improving its performance, accuracy, and efficiency

➢ Removing of irrelevant features from the data like Patient id & name.

➢ Data preprocessing like handling the missing values, providing numerical labels to the the categorical data.

➢ Selection of ML Model.

➢ Analyzing the predictions using confusion matrix to understand the type of errors.

Conclusion

➢ A well-optimized heart stroke prediction ML model can significantly enhance the accuracy and reliability of heart stroke risk assessments.

➢ Early detection is crucial in stroke prevention. ML models enable healthcare providers to identify at-risk patients earlier than traditional methods might allow.

➢ ML models contribute to personalized healthcare by tailoring risk assessments and preventive strategies to individual patients based on their unique health profiles and risk factors.

➢ In conclusion, as technology continues to evolve, the integration of advanced ML models into healthcare systems will play a crucial role in advancing heart stroke prevention and overall public health.

Future Scope

➢ The future scope of heart stroke prediction ML models is expansive and exciting. As technology evolves, these models will become more accurate, personalized, and integrated into healthcare systems.

➢ Integration with smartwatches and fitness trackers can provide real-time health data, such as heart rate and blood pressure, enhancing the model's predictive capabilities and enabling continuous monitoring.

➢ Developing systems that provide real-time stroke risk predictions based on live data from wearable devices and health apps can facilitate immediate interventions.

➢ Integrating predictive models with alert systems that notify healthcare providers and patients of potential stroke risk can improve response times and preventive actions.