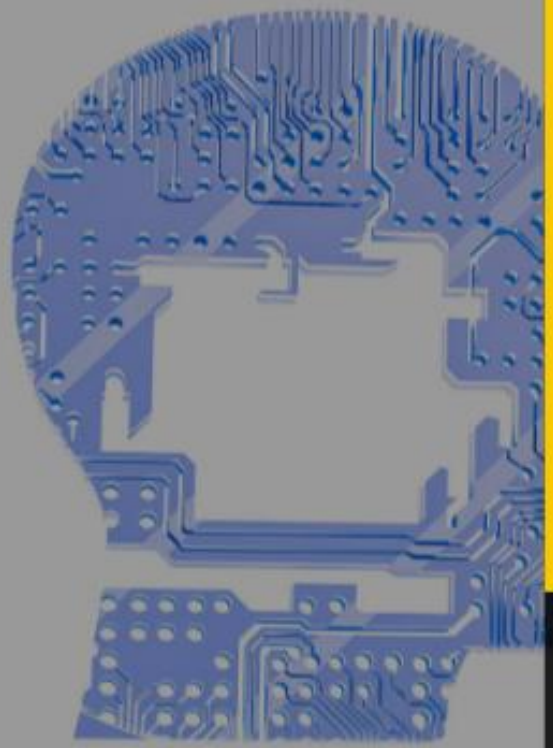
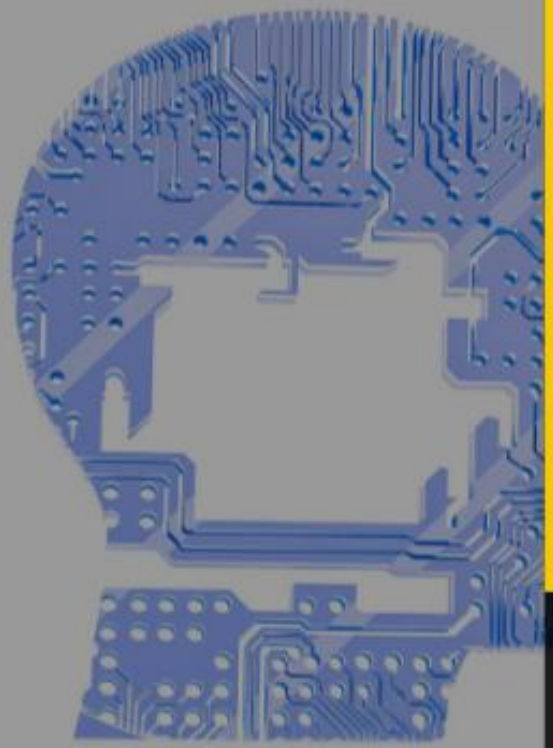


Predictive Modeling of Stroke Risk in High-Risk Populations

Using Machine Learning Techniques



Predictive Modeling of Stroke Risk in High-Risk Populations

Using Machine Learning Techniques

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Table Of Content

Problem Statement

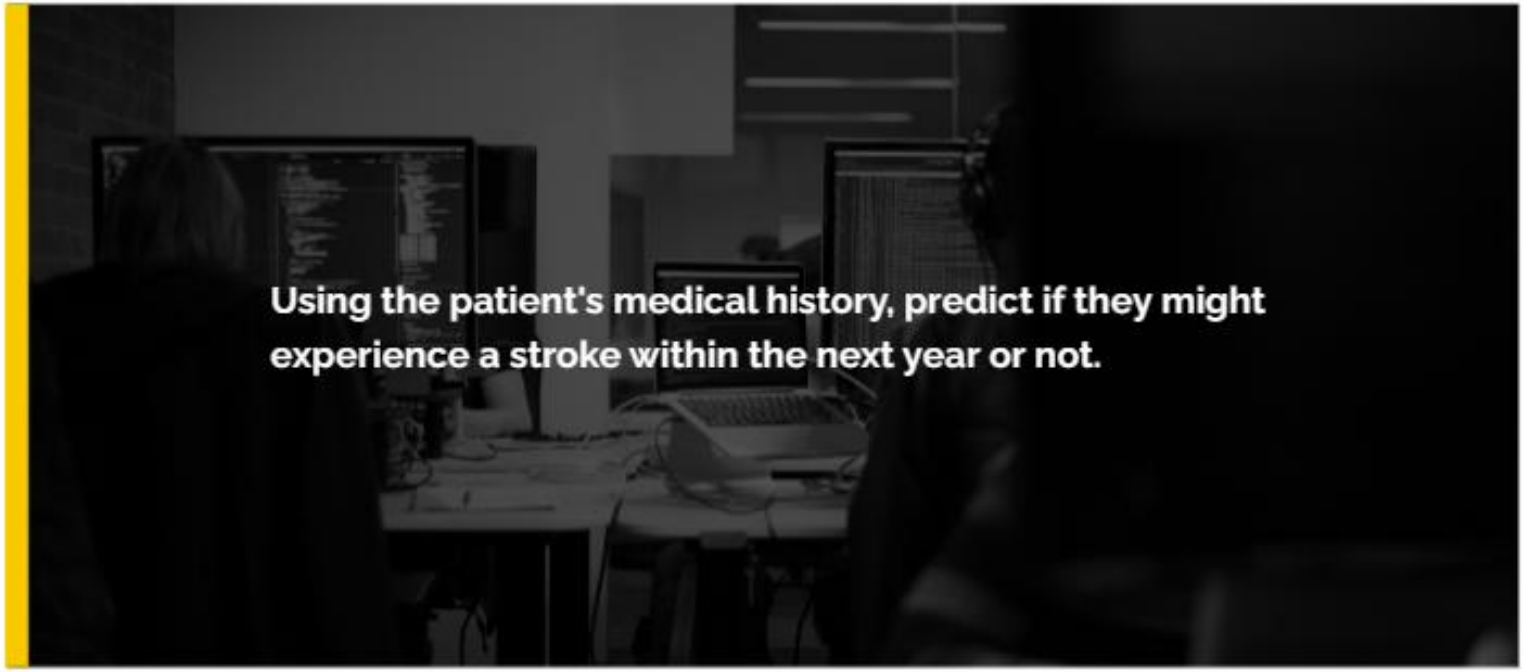
- Importance of Stroke Risk Prediction
- Machine Learning Advancements
- Application in High-Risk Populations

Introduction

- What is Stroke?
- Ischaemic stroke
- Hemorrhage stroke
- Transient Attack or TIA (mini-stroke)

destructive illness: influences individuals over 65y(typically) → Prediction of stroke: Time consuming and tedious → Predicting stroke: machine learning → Multiple algorithms and Comparison

What are we trying to solve?



Machine Learning Techniques

Logistic Regression

Random Forest

Gradient Boosting

Neural Networks

Predictive Modeling and Feature Importance

Utilizing machine learning algorithms for predictive modeling of stroke risk involves identifying the most important features that contribute to the prediction.

Understanding the impact of different features on the overall prediction model is crucial for effective risk assessment and stratification.

Feature Importance By Random Forest

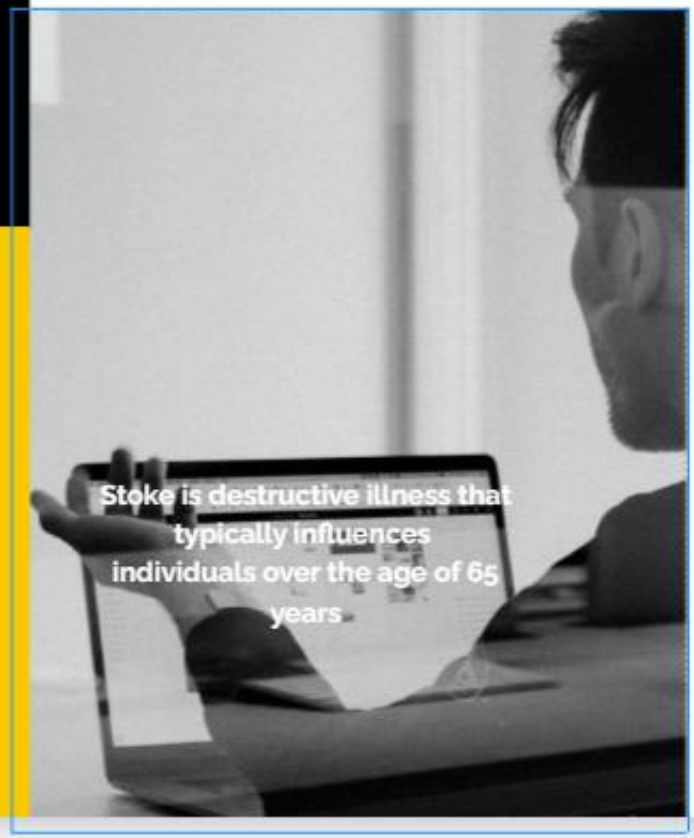
Random Forest algorithm is used to determine the most important features for stroke risk prediction.

The identified features are then utilized in the development of the predictive model.

SAMPLE DATASET

gender	age	hypertens	heart_dis	ever_mar	work_typ	Residence	avg_gluco	bmi	smoking_	stroke
Male	67	0	1	Yes	Private	Urban	228.69	36.6	formerly s	1
Male	80	0	1	Yes	Private	Rural	105.92	32.5	never smo	1
Female	49	0	0	Yes	Private	Urban	171.23	34.4	smokes	1
Female	79	1	0	Yes	Self-empl	Rural	174.12	24	never smo	1
Male	81	0	0	Yes	Private	Urban	186.21	29	formerly s	1
Male	74	1	1	Yes	Private	Rural	70.09	27.4	never smo	1
Female	69	0	0	No	Private	Urban	94.39	22.8	never smo	1
Female	78	0	0	Yes	Private	Urban	58.57	24.2	Unknown	1
Female	81	1	0	Yes	Private	Rural	80.43	29.7	never smo	1
Female	61	0	1	Yes	Govt_job	Rural	120.46	36.8	smokes	1
Female	54	0	0	Yes	Private	Urban	104.51	27.3	smokes	1
Female	79	0	1	Yes	Private	Urban	214.09	28.2	never smo	1
Female	50	1	0	Yes	Self-empl	Rural	167.41	30.9	never smo	1
Male	64	0	1	Yes	Private	Urban	191.61	37.5	smokes	1
Male	75	1	0	Yes	Private	Urban	221.29	25.8	smokes	1
Female	60	0	0	No	Private	Urban	89.22	37.8	never smo	1
Female	71	0	0	Yes	Govt_job	Rural	193.94	22.4	smokes	1
Female	52	1	0	Yes	Self-empl	Urban	233.29	48.9	never smo	1
Female	79	0	0	Yes	Self-empl	Urban	228.7	26.6	never smo	1
Male	82	0	1	Yes	Private	Rural	208.3	32.5	Unknown	1
Male	71	0	0	Yes	Private	Urban	102.87	27.2	formerly s	1
Male	80	0	0	Yes	Self-empl	Rural	104.12	23.5	never smo	1
Female	65	0	0	Yes	Private	Rural	100.98	28.2	formerly s	1
Male	69	0	1	Yes	Self-empl	Urban	195.23	28.3	smokes	1

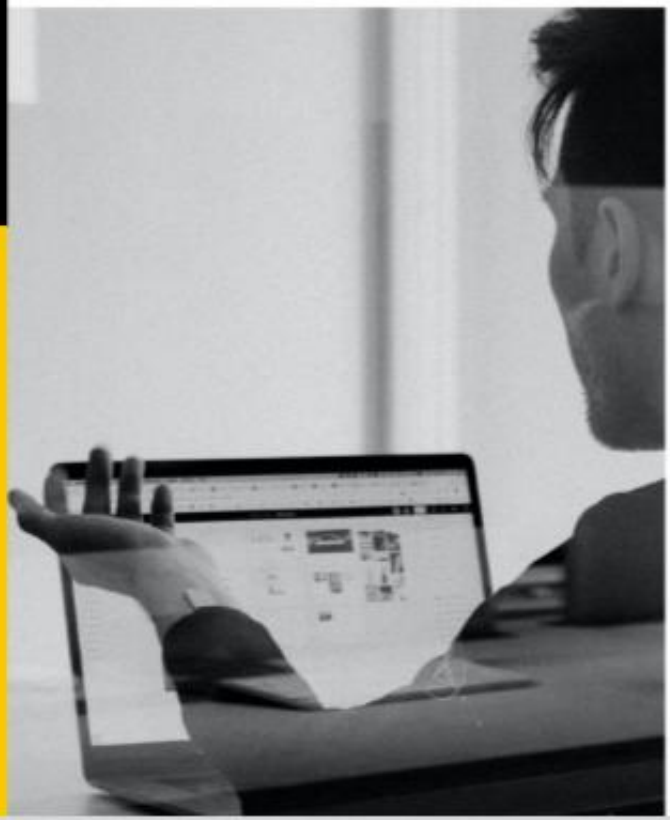
STUDY ON EXISTING WORKS



A SURVEY ON STROKE PREDICTION

- Machine learning and neural network algorithms are implemented.
- The subsampling techniques for balancing the dataset is followed.
- Dimensionality reduction techniques are implemented in analyzing the attributes.
- Normalization and Standardization methods used for Data Scaling

STUDY ON EXISTING WORKS



A SURVEY ON STROKE PREDICTION

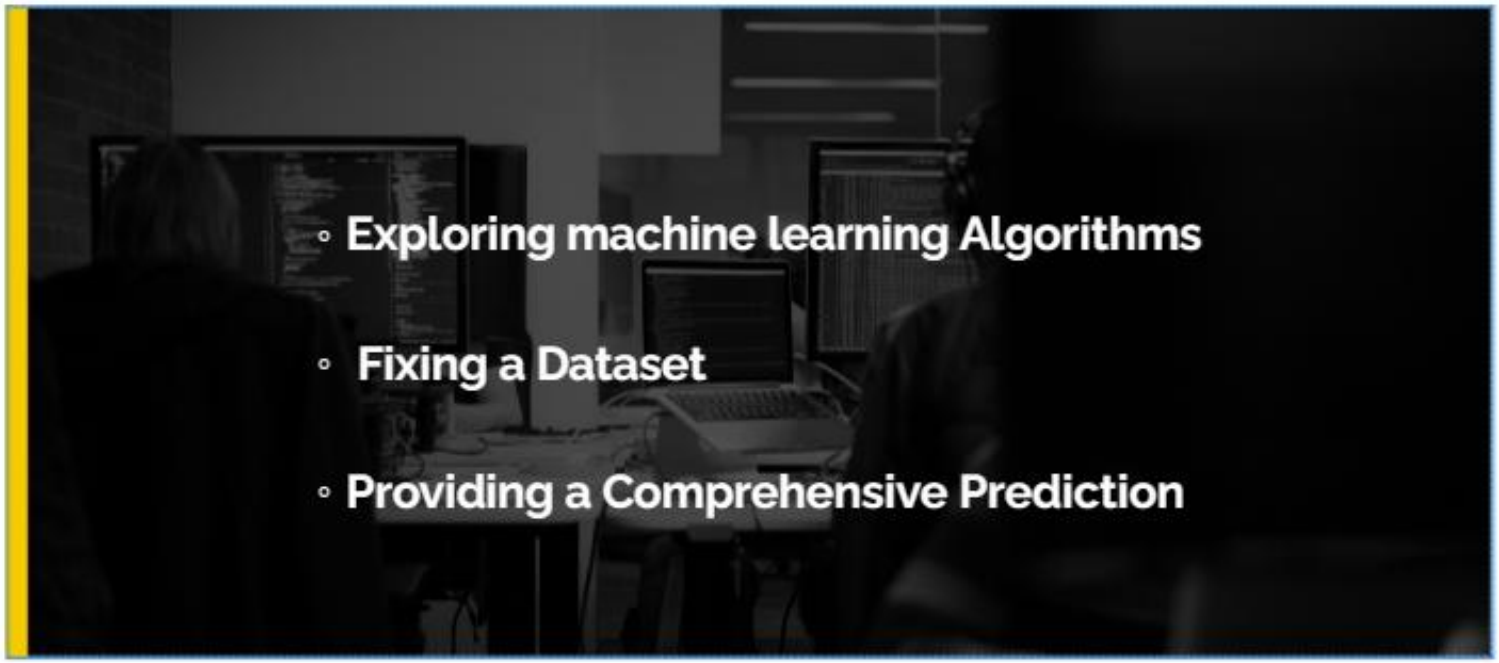
- Statistical Tests for Feature Selection
- Modeling and visualization of results for algorithms
- Data Balancing using SMOTE
- Exploratory Data Analysis (EDA)

System Requirements for Stroke Prediction Using ML

Software Requirements:

- **Operating System:** Windows, Linux
- **IDE:** Jupiter Notebook, Google Colab
- **Data Set:** .csv file, .json file
- **Visualization:** Mat plot lib, pandas
- **Server:** Web Server with HTTP Process

Conclusion


Exploring machine learning Algorithms
Fixing a Dataset
Providing a Comprehensive Prediction

References

[1] *Nojood Alageel, Rahaf Alharbi, Rehab Alharbi, Maryam Alsayil.* A Survey on Using Machine Learning Algorithm as a Method for Improving Stroke Prediction.
International Journal of Advanced Computer Science and Applications 14(4), 2023

[2] *Krishna Mridha, Sandesh Ghimire, Jungpil Shin, Anmol Aran.* Automated Stroke Prediction Using Machine Learning: An Explainable and Exploratory Study With a Web Application for Early Intervention.
IEEE Access PP(99):1-1, 2023

[3] *Nitish Biswas, Khandaker Mohammad Mohi Uddin, Sarreha Tasmin Rikta, Samrat Kumar Dey.* A comparative analysis of machine learning classifiers for stroke prediction: A predictive analytics approach.
Healthcare Analytics, November 2022

[4] *Alastair Smith.* Predicting Stroke Patient Recovery from Brain Images: A Machine Learning Approach.
National Stroke Strategy, 2007


THANK YOU
Machine Learning
For Stroke Prediction
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