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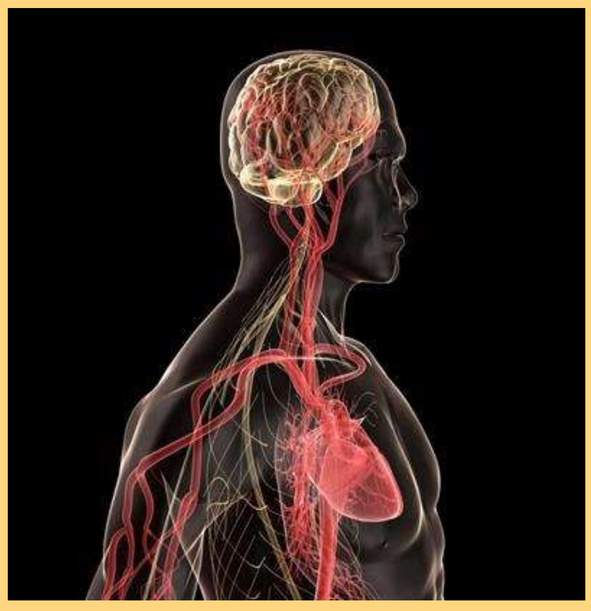
Accuracy Improvement On Automated Stroke Anticipating Mechanism Using Advanced Random Forest Algorithm In Contrast To Stochastic Gradient Descent

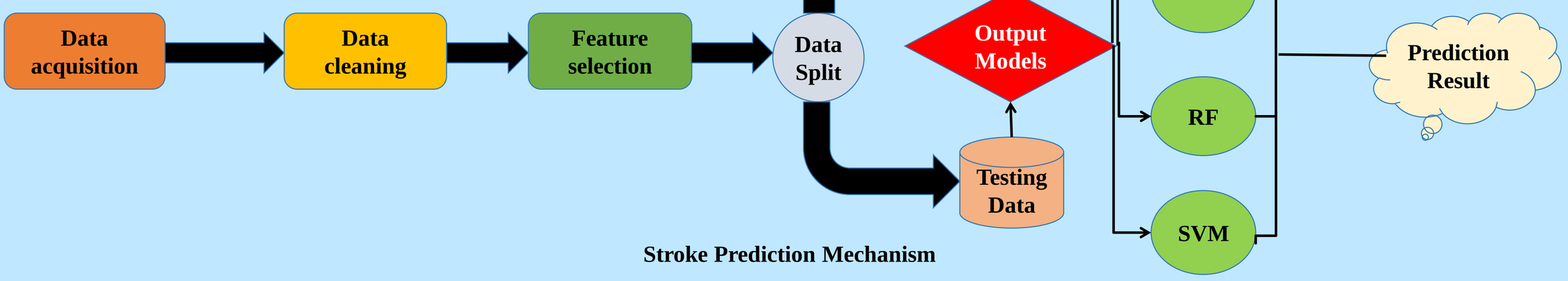
INTRODUCTION

- The aim of this study is to Develop a highly accurate automated mechanism for stroke anticipation using an enhanced Random Forest algorithm and compare its performance with the Stochastic Gradient Descent algorithm.
- The objective is to compare and contrast RF with SGD in terms of accuracy for stroke Anticipating Mechanism Using Machine Learning Algorithms.
- The study involves two groups, each with a sample size of 10 patterns, using 'healthcare-dataset-stroke-data.csv' data set for Stroke Prediction Mechanism with machine learning. Prediction settings G-power 90%, CI 95% & α=5%
- Machine learning techniques are used to Automated Stroke Anticipating Mechanism by analysing previous Anticipating Rate and other relevant parameters.
- The system makes use of RF and SGD which are optimized for the prediction of stroke Mechanism.
- The mechanism would gather data from various sources, including medical records, physiological sensors, imaging scans (like MRI or CT scans), and wearable devices.
- Implementation of the Advanced Random Forest Algorithm leads to superior stroke anticipation accuracy compared to Stochastic Gradient Descent, facilitating timely interventions and improved patient outcomes in clinical settings.



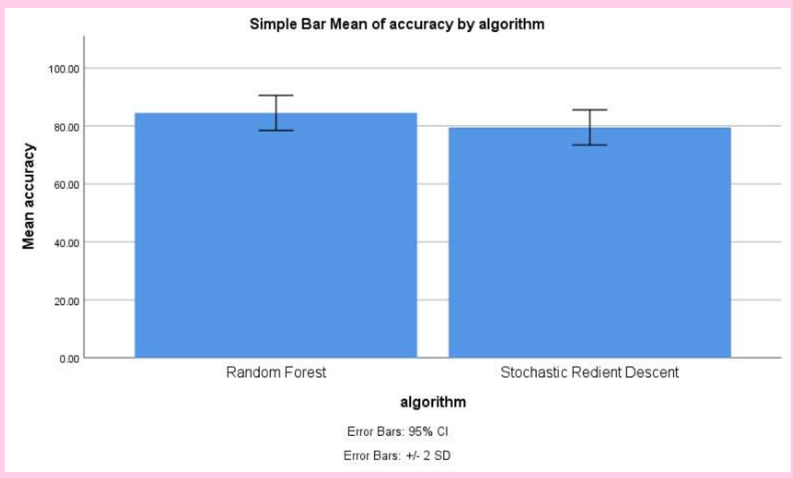
Stroke Prediction Mechanism

MATERIALS AND METHODS



Stroke Prediction Mechanism

RESULTS



Comparison of RF algorithm and SGD algorithm considering mean accuracy

	Algorithm	N	Mean	Std.Deviation	Std.Error Mean
Accuracy	RF	10	82.5000	2.02765	0.95743
	SGD	9	75.0000	2.73861	0.91287

Leven's Test for Equality of Variances				t-test for Equality of Mean			95% Confidence Interval of the Difference	
		F	Sig	Sig (2-tailed)	Mean Difference	Std.Error Difference	Lower	Upper
Accuracy	Equal Variance assumed	0.00	0.025	.001	6.27000	.02587	5.17363	8.36637
	Equal Variance not assumed			.001	6.27000	.02587	5.17329	8.36671

DISCUSSION AND CONCLUSION

- The p-value (significance) is <0.001 obtained from the Independent Samples t-Test using the SPSS statistical tool, which is less than our chosen significance level p=<0.05. In other words, the observations were statistically significant. In this Test we are Taking 10 Samples For Each Group.
- The Random Forest has an 97.00% accuracy when compared to the Stochastic Gradient Descent with an accuracy of 88.00%.
- The major drawback is Random Forest models are often considered "black box" models, meaning it can be challenging to interpret the decision-making process and understand how individual features contribute to predictions. This lack of interpretability may hinder the understanding of the underlying mechanisms driving stroke anticipation.
- Additionally, Relevant data on patients with stroke history and individuals without were collected from clinical records and databases.
- This could lead to timely interventions, potentially reducing the incidence and severity of strokes.
- In future the drawbacks can be overcome by implementing advanced machine learning algorithms such as Random Forest which give more accuracy within a a short interval of time.
- According to the findings, in terms of accuracy, the Random Forest achieves considerably better than the Stochastic Gradient Descent for Stroke Anticipating Mechanism

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