# Investigation and Study of Machine Learning and Its Application to Stroke Diagnosis

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***Abstract*—This undergraduate thesis explores the application of machine learning in diagnosing stroke. The author reviews machine learning techniques and their applications in healthcare, focusing on stroke diagnosis. The work includes the implementation of several machine learning algorithms in Python and their evaluation on a stroke dataset. The author plans to extend the study by incorporating deep learning algorithms in the future. The thesis highlights the importance of early detection and decision support in stroke diagnosis, emphasizing the potential of machine learning in healthcare. However, the study lacks extensive testing and validation, and the results are not quantitatively reported.**

***Index Terms*—machine learning, stroke diagnosis, data science, neural networks, Python, healthcare**

## I. Introduction

The thesis provides an overview of machine learning and its applications, particularly in the context of stroke diagnosis. It discusses the increasing use of machine learning in healthcare to support data analysis and decision-making in diagnosing diseases. The author aims to contribute to the field by applying machine learning techniques to improve stroke diagnosis. The work covers the implementation of clustering and neural network methods on a stroke dataset, but specific numerical results are not provided [1]. Earlier ICTU student work on related designs is included here for context [8]. Related published studies provide context for the subject and methods [9], [10]. These contextual works were selected for this English summary; they are not asserted to appear in the original thesis bibliography.

## II. Methods

The author implemented several machine learning algorithms using Python, including clustering and neural network methods, on a stroke dataset. The performance of these algorithms was evaluated, but specific numerical results are not reported. The author plans to extend the study by incorporating deep learning algorithms in the future. The dataset used for the study is not detailed, and the evaluation methods are not explicitly described [1].

## III. Results

The results of the implemented machine learning algorithms were compared, but detailed numerical evaluations are not reported. The author plans to extend the study by incorporating deep learning algorithms in the future. The comparison of the algorithms suggests that some methods performed better than others, but the exact performance metrics are not provided. The study lacks a comprehensive evaluation of the algorithms' effectiveness in diagnosing stroke [1].

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## IV. Discussion

The author discusses the importance of early detection and decision support in stroke diagnosis. The application of machine learning in healthcare is seen as a promising approach to improve patient outcomes. The limitations of the current study include the need for more extensive testing and validation. The author acknowledges the need for further research and development, particularly in incorporating deep learning techniques. The study's findings are limited by the lack of quantitative data and the absence of a deployed system or field installation [1].

## V. Conclusion

The thesis concludes that machine learning can be effectively applied to stroke diagnosis, contributing to the early detection and management of the disease. The author acknowledges the need for further research and development, particularly in incorporating deep learning techniques. The study's findings are limited by the lack of quantitative data and the absence of a deployed system or field installation [1].

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