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A Deep Learning Framework for Prediction of Cardiopulmonary Arrest

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Abstract

INTRODUCTION: The cardiopulmonary arrest is a major issue in any country. Gone are the days when it used to happen to those who are aged but now it is a major concern emerging among adolescents as well. According to the World Health Organization (WHO), cardiac arrest and stroke is still a major concern and remains a public health crisis. In past years India has witnessed many cases of heart related issues which used to occur predominantly among people having high cholesterol. But now the scenario has changed, and cases have been observed in people having normal cholesterol levels. There are several factors involved in heart stroke such as age, sex, blood pressure, etc. which are used by doctors to monitor and diagnose the same.
OBJECTIVES: This paper focuses on different predictive models and ways to improve the accuracy of prediction by analyzing datasets on how they affect the accuracy of certain algorithms.
METHODS: The factors contributing to heart issues can be used as a beacon to predict the stroke and help an individual to further consult a doctor beforehand. The idea is to target the datasets and the prediction algorithms of deep learning including advanced ones to improvise it and attain a better result.
RESULTS: This paper brings out the comparative analysis among neural network techniques like ANN, Transfer Learning, MAML and LRP in which ANN showed the best result by giving the highest accuracy of 94%.
CONCLUSION: Furthermore, it discusses a new attribute called “gamma prime fibrinogen” which could be used in the future to boost prediction performance.

Keywords: Heart Stroke; Adolescent; Neural Network; Predictive Models; Fibrinogen

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1. Introduction

Health plays a vital role in any person’s life. Everyone needs to keep their health in check and be free from ailment. However, some health issues are uncertain and could become a barrier to smooth smooth-running lifestyle. Such uncertain issues involve heart stroke, cancer, diabetes, etc. and they need to be diagnosed and controlled beforehand. Cardiopulmonary arrest or heart stroke is one of the health conditions that can happen to any individual. The probability of a stroke depends on diet and the lifestyle that a person has. It is evident from past observations recognized by reputed organizations like the World Health Organization (WHO) and Centre for Disease Control (CDC) that heart stroke is a frequently occurring issue and the pattern of occurrence is changing day by day. Heart stroke is caused

(MAML) less effective in the long run. Lastly, while layer-wise relevance propagation (LRP) does not contribute significantly to improving predictive performance, ANN models are capable of achieving better results in this regard. Testing algorithms on two different datasets also showed that the features in a dataset might impact the accuracy of the algorithm. For future scope by improvising the algorithms like bringing change in activation function in neural networks or by introducing new attribute like gamma prime fibrinogen could help predictions perform even further.

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