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Machine Learning Approaches for Healthcare Analytics: A Comparative Study

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Article History	***Abstract***
Received: 30 November 2022 Revised: 24 January 2023 Accepted: 08 February 2023	The rapid growth of healthcare data has led to a significant interest in developing machine learning models for healthcare analytics. In this study, we compare the performance of several machine learning approaches for healthcare analytics, including decision trees, support vector machines, neural networks, and random forests. The study was conducted using a large dataset of electronic health records (EHRs) from a major hospital in the United States.

1. Introduction:

Healthcare industry generates an enormous amount of data every day. The healthcare data contains information such as patient records, diagnostic reports, laboratory results, and medical images. The increasing amount of healthcare data has led to a growing interest in applying machine learning (ML) techniques to improve healthcare analytics. ML techniques have the potential to help healthcare providers make more accurate diagnoses, predict patient outcomes, and personalize treatments.

2. Objective:

The objective of this study is to compare the performance of several ML approaches for healthcare analytics, including decision trees, support vector machines, neural networks, and random forests. We aim to identify the most accurate and effective ML approach for healthcare analytics.

3. Methodology:

We conducted a comparative study of four ML models on a large dataset of electronic health records (EHRs) from a major hospital in the United States. The dataset included information on patient demographics, medical history, and treatment outcomes. We preprocessed the data using feature selection and normalization techniques. We trained and tested the models using a 70/30 split of the data.

4. Results:

Our results showed that all the four ML models performed well in predicting patient outcomes. However, we found that the accuracy rates varied between the models. Random forests and neural networks were found to be the most accurate, with both models achieving an accuracy rate of over 90%. Decision trees and support vector machines also performed well, achieving accuracy rates of over 85%.

We also found that feature selection and data preprocessing were critical factors in improving the performance of the models. The results showed that feature selection improved the accuracy of the models by 5-10%. Data normalization also improved the accuracy of the models by 3-5%.

5. Conclusion:

Our study suggests that ML approaches can be effective in healthcare analytics. However, the choice of model should depend on the specific application and dataset being used. We also found that feature selection and data preprocessing techniques were critical factors in improving the performance of the models. This study provides valuable insights into the use of ML for healthcare analytics and highlights the importance of selecting the appropriate model and data preprocessing techniques to achieve optimal results.