A Predictive Modeling of Tracheostomy Readmissions

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Abstract

Hospital readmissions following the completion of a procedure poses significant challenges for both patients and hospitals. Being readmitted could increase the risk of complications for patients and introduce states of distress. For hospitals, readmissions present a strain on resources and their reputation. This project aims to develop a model that can predict whether a patient will be readmitted within 30 days of being discharged. After thorough data preprocessing and feature extraction, three models were trained on patient data from 2018 and tested on patient data from 2019 to determine predictive performance: a null model, a support vector machine (SVM), and a random forest (RF). Using Matthew's Correlation Coefficient to compare models, the HERE model had the best performance with a coefficient of HERE while the null model has a coefficient of HERE, and the HERE model has a coefficient of HERE.

1 Introduction

In the medical field of Otolaryngology, preventing hospital readmissions following procedures such as tracheostomies, total laryngectomies, or mastoidectomies is significant both medically for patients as well as financially for healthcare institutions. Medically, avoiding readmissions can benefit patients' well-being as it reduces the possible distress and suffering experienced from complications from new or returning medical conditions. Financially, preventing readmissions is crucial for hospitals who are paid by capitation. Capitation is a payment system that pays hospitals a fixed amount per patient for a prescribed period, therefore incentivizing hospitals to conduct less procedures and treat patients as efficiently as possible. As a result, hospitals paid by capitation incur the costs that are associated with providing care to patients who are readmitted. Knowing if a patient might be at higher risk of a readmission

would allow doctors to increase the effectiveness of their initial interventions and promote a smoother recovery process while maintaining their reputation and quality of care. Therefore, developing predictive models that can predict whether a patient will be readmitted is essential for ensuring the efficiency of healthcare.

This project aims to build a model that predicts if a patient who underwent a tracheostomy procedure is going to be readmitted within 30 days of being discharged from the hospital. For those patients who are readmitted within 30 days, this project also analyzes the number of days until they will be readmitted as well as the most common diagnoses that the patients will be readmitted with.

2 Data Preprocessing

3 Exploratory Data Analysis

4 Methods and Analysis

5 Conclusion

Acknowledgments. Acknowledgments are not compulsory. Where included they should be brief. Grant or contribution numbers may be acknowledged.

Please refer to Journal-level guidance for any specific requirements.

Appendix A

An appendix contains supplementary information that is not an essential part of the text itself but which may be helpful in providing a more comprehensive understanding of the research problem or it is information that is too cumbersome to be included in the body of the paper.