Medicine Recommender System from Electronic Health Records

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Abstract—hello World

Index Terms—Recommender Systems, Health Care AI, Collaborative Filtering, Electronic Health Records.

I. INTRODUCTION

With over 20,000 prescription-only FDA approved medications, doctors may face a challenge when prescribing medicine to a specific patient. Unfortunately, the FDA receives more than 100,000 declarations of medication errors each year in the United States alone [1]. Modern hospitals use Electronic Health Records (EHR) to keep track of everything and deal with this complexity [2].

EHRs are a collection of clinical information gathered from health care patients. The mass adoption of such systems delivers a large amount of data compiled on a patient's visits, such as demographics, diagnosed conditions, medical prescriptions, procedures and any health-related history [2].

This data provides use cases for machine learning systems to improve and automate clinical care practices, for example, early disease detection and identifying patients at high risk of severe conditions [3], [4].

A system that recommends a list of medicine based on a patient's current state will serve as an essential decision-support tool for medical experts to assist with drug prescriptions. Recommender Systems (RS) are techniques that derive patterns and suggest items to a user [5]. Providing RSs with EHR data of drugs and patient information could result in a system that recommends personalised medical results. Existing medicine recommender systems make use of user reviews or past user diagnosis [6], [7]. This study will try to answer the following research question:

> *Can a recommender system use techniques such as collaborative filtering to suggest a list of medication personalised to a patient by using information from an EHR such as demographics, diagnosis, and physiologic data?*

II. AIM AND OBJECTIVES

The new era of precision medicine brings forward systems that can work hand in hand with clinicians by personalising the patient's results and preventing medication errors. However, health RSs come with both an opportunity and a challenge.

A. Aim

This proposed project aims to build a health RS that uses a person's current state to recommend a set of personalised medications from an EHR.

B. Objectives

We form the following objectives to achieve our aim:

- The first objective is to address cold start issues when introducing new patients and find the best model suited for all possible scenarios.
- The second objective is to aggregate the EHR dataset with a drug interactions dataset containing information about a specific medication and its effects and conflicts with other drugs. This combination ensures that any recommended medicine does not cause harm or damaging side effects to any patients.
- The third objective is to determine which data in the EHR holds the most value when predicting medicine to patients.

III. BACKGROUND

A. Techniques

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B. Similar Systems

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IV. PROPOSED IDEA

A. Testing and Evaluation

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B. Challenges and Limitations

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