Chapter 55
Drug Prediction in Healthcare Using Big Data and Machine Learning

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ABSTRACT

The healthcare system is literally losing patients due to improper diagnosis, accidents, and infections in hospitals alone. To address these challenges, the authors are proposing the drug prediction model that will act as informative guide for patients and help them for taking right medicines for the cure of particular disease. In this chapter, the authors are proposing use of Hadoop distributed file system for the storage of medical datasets related to medicinal drugs. MLLib Library of Apache Spark is to be used for initial data analysis for drug suggestions related to symptoms gathered from particular user. The model will analyze the previous history of patients for any side effects of the drug to be recommended. This proposal will consider weather and maps API from Google as well so that the patients can easily locate the nearby stores where the medicines will be available. It is believed that this proposal of research will surely eradicate the issues by prescribing the optimal drug and its availability by giving the location of the retailer of that drug near the customer.

DOI: 10.4018/978-1-6684-6291-1.ch055

INTRODUCTION

This section of chapter provides a brief outline of introduction to machine learning and health care, use of big data pipeline in health care systems and role of machine learning and big data in drug prediction. The authors have tried to provide the utility of drug discovery in terms of machine learning and big data pipeline.

Introduction to Machine Learning and Health Care

Machine Learning is presently playing major role in Health Care Systems by using various forms of data accumulated over years to derive meaningful insights. Health Care Systems are actively making use of machine learning along with Big Data Analytics to provide proper diagnosis and solutions for diseases by predicting right kinds of drugs. Whenever patient's complaint for any kind of disease, all symptoms are recorded and forwarded to computer with machine learning intelligence. Physicians usually recommend patients to undergo various tests and the inferences are carried out to resolve patient problems by using machine learning approach. For example, once the patient visits any consulting physician, the next step is to take scans in terms of X-rays and MRI's. These scans are later provided as input to machine learning models to diagnose patient problems and health condition with better results.

Use of Big Data Pipeline in Health Care Systems

The inclusion of Big Data Analytics has brought new opportunities for treating patients in the domain of drug development and precision medicines. The use of Big Data Analytics along with Machine Learning has transformed health care systems to the next level. However still Health Care systems are fighting for the right understanding of diseases and drugs. According to (Schork, N. J. 2015), only 25% patients are benefitted from the top 10% drugs which are prescribed in United States Health Care Systems. This percentage is only 2% for patients who are prescribed for cholesterol drugs. The implementation of Big Data helps in tasks for maintaining data in terms of Electronic Health Records and brings data in perfect shape for data monitoring. Big Data is playing its vital role for bringing global medical system together and allowing places and countries to get best treatments and consultation. Social media is the medium where Big Data Analytics has contributed in Health Care Systems. People speak about diseases on social networking sites like Facebook and Twitter. This kind of real data is to be analyzed for insights for various kinds of health care information's by various Big Data Techniques and help in awareness among masses at global level (Bachrach, Y. et al. 2012). The valuable insights can be drawn out of clinical data by the use of smart healthcare technology in terms of big data analytics. This process achieves success in presenting patients risk forecast. This approach will certainly replace the expensive procedures used for maintaining records for patients in Health Care Systems. Big Data Technology has allowed to store huge amounts of patient data in terms of quantity and thus to continuously analyze it for improving quality of life. Big Data Market in terms of Health Care Systems is estimated to grow its market place from 10 billion dollars in year 2016 to 27.6 billion dollars by year 2021 (Kalyan Banga, 2016). The year wise increase in Big Data markets is shown in Figure 1.