XERXEZ SOLUTIONS
DEVELOPMENT – TRAINING – RESEARCH

Project Name: Machine Learning in Healthcare and Biomedical Applications

ABSTRACT: Clinical data describing the phenotypes and treatment of patients represents an underused data source that has much greater research potential than is currently realized. Mining of electronic health records (EHRs) has the potential for establishing new patient-stratification principles and for revealing unknown disease correlations. Integrating EHR data with genetic data will also give a finer understanding of genotype–phenotype relationships. However, a broad range of ethical, legal, and technical reasons currently hinder the systematic deposition of these data in EHRs and their mining. Here, we consider the potential for furthering medical research and clinical care using EHR data and the challenges that must be overcome before this is a reality. In this project, we are going to demonstrate multiple types of disease and how machine learning can help us to predict disease with respect to types and symptoms.

INTRODUCTION: The use of electronic health records (EHRs) has increased dramatically in the past 5 years. In 2009, 12.2% of US hospitals had a basic HER system, increasing to 75.5% by 2014.1 Beyond facilitating billing and patient care, the dynamic clinical patient information captured in structured EHRs provides opportunities for research, including developing and refining risk prediction algorithms.

EHR-based risk prediction studies depart from traditional risk prediction studies in several significant ways. Traditionally, risk prediction algorithms have been developed from large cohort studies such as the Framingham Heart Study.3 These studies were designed to follow people for years or even decades. As such, they have predefined inclusion. criterion, regular follow-up of participants, specified metrics to collect, and protocols for adjudicating outcomes. Unlike cohort data collected for research purposes, EHR data are collected de-facto, more frequently, and may lack the same standardization as cohort studies. As others have noted, EHR data comes with many challenges. EHRs include all patients that touch a medical system, primarily capture data only when patients are ill, and collect metrics that clinicians deem to be necessary at each clinic visit. The data tend to be very “messy” leading to many potential analytic challenges and biases. Further, EHR-based outcomes and

diagnoses vary based on how they are defined and from what data (ie, billing codes, medical problem lists, etc.) they are derived.

However, there are multiple advantages to EHR-based risk prediction. Such de facto data collection allows one to observe more metrics, on more individuals, at more time points, and at a fraction of the cost of prospective cohort studies. One can use the same set of data to predict a wide range of clinical outcomes – something not possible in most cohort studies. As data are sometimes observed with greater frequency (as opposed to yearly visits), it is also easier to predict near term risk of events. Furthermore, patient populations derived from the EHR may be more reflective of the real-world than cohort studies that rely on volunteer participation. Finally, prediction models based on EHR data can often be readily implemented unlike traditional algorithms that need to be translated to a clinical environment.

RELATED WORK & EXISTING PROBLEM:

We first provide a brief review of machine learning and deep learning models for healthcare applications, and then discuss the existing works on benchmarking healthcare datasets.

Early works have shown that machine learning models obtain good results on mortality prediction and medical risk evaluation. Physio net challenge a friendly competition platform has result in development of machine learning models for addressing some of the open health care problems. With the recent advances in deep learning techniques, there is a growing interest in applying these techniques to healthcare applications due to the increasing availability of large-scale healthcare data. For example, Cheetal. developed a scalable deep learning framework which models the prior knowledge from medical on to logiest to learn clinically relevant features for disease diagnosis. A recent study showed that a neural network model can improve the prediction of several psychological conditions such as anxiety, behavioral disorders, depression, and post-traumatic stress disorder. Other recent works have leveraged the power of deep learning approach es to model diseases and clinical time series data. These previous works have demonstrated the strong performance by deep learning models in healthcare applications, which significantly all evirates the tedious work on feature engineering and extraction.

The availability of deidentified public datasets such as Medical Information Mart for Intensive Care (MIMIC-II and MIMIC-III) has enabled researchers to benchmark machine learning models for studying ICU clinical outcomes such as mortality and length of hospital stay. Pirracchio used MIMICII clinical data to predict mortality in

the ICU and showed that the Super Learner algorithm- an ensemble of machine learning models, performs better than SAPSII, APACHEII and SOFA scores. Their work showed that machine learning models outperform the prognostic scores, but they did not compare their results with the recent deep learning models.

TECHNOLOGY WE COVER:

1. Python Programming
2. Machine Learning/Deep Learning
3. Django – Front End
4. PostgreSQL – Database
5. MLOps using MLFLow – Model Orchestration
6. Github Action - CI/CD Pipeline
7. DVC for Data Tracking
8. DagsHub
9. Docker and Kubernetes

OUR OFFERING:

1. Complete Implementation of Project
2. Training and Project Deployment on local system
3. Project Completion Certificate
4. Paper Publication in IJera International
5. Project Report
6. Xerxez T-Shirts

DISCLOSURE:

1. Students must prepare the PPT for demonstration.
2. 50% Advance and 50% during project submission.
3. Once Payment is done, cannot be refundable.

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