COMPARISON OF ALGORITHMS FOR MORTALITY PREDICTION IN HEALTHCARE

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ABSTRACT

Big data is the large amounts of data that cannot be proceed by making use of traditional methods of data processing. Big data is the compendium o big data sets that cannot proceed using traditional computing techniques. It is not a technique that can be worked on its own or in isolation. The properties of signify big data are volume, variety, velocity, variability and complexity. Real-time prediction of mortality for intensive care unit patients as the potential to provide physicians with a simple and easily interpretable synthesis of patient acuity. Here we extract data from the random time during each patient's ICU stay.

Keywords: Big data, health care, Mortality, ICU.

1. INTRODUCTION:

Big data is the term for massive datasets having large, more varied and complex structure with difficulties of storing, analysing, and visualizing of further process or results. Big data and its analysis are of business. There data are generated from online transaction, email, videos, audios, image, mobile phone and their application [1]. In the present Indian scenario, healthcare information is independently maintained by hospitals, institutions and not readily accessible in a centralized, informed manner. This greatly limits the health provider's effort to improve quality and efficiency. [2].

1.1 Big data in Health care:

Health care big data refers to collecting, analysing and leveraging consumer, patient, physical and clinical data that is too vast or complex to be understood by traditional means of data processing. Instead, big data is often proceed by machine learning algorithms and data scientist,[3]. Healthcare is the multidimensional system established with the sole aim for prevention, diagnosis, and treatment of health related issues or impairments in human begin. The major components of the health care system are the health professional's health facilities, and financing institutions supporting the frame two. The health professionals belong to various health sectors like dentistry, medicine, midwifery, nursing, psychology, physiotherapy and many others

1.2 ELECTRONIC HEALTH RECORDS

It is important to note that the national institute of health(NIH) recently announced the "All of us" initiative that to collect one million or more patients data such as EHR including medical imaging, socio- behavioural and environmental data over the next few years. HER, have introduced many advantages for handling modern health care related data. Below, we describe some of the characteristic advantages of using EHR. The first advantage of EHR is that health care professional have an improved access to the entire medical history of a patient. The information includes medical diagnoses, prescription, data related to known allergies, demographics, clinical narratives, and the result obtained from various laboratory tests. The recognition and treatment of medical conditions thus and time efficient due to a reduction in the lag time of preview test results.(4).

2. Comparison of Algorithm.

Nowadays health organisations are capable of collecting and generating a huge amount of data. Extracting the knowledge and determine interesting and possible by use of data mining. The knowledge gained is this way can be used in the proper order to improve work efficiency and enhance the quality of decision making.

Here we are comparing the algorithm for molality prediction:

2.1 Improving palliative care with deer learning.

- Model used: Fully connected deep learning network.
- Data has 13654 columns and 221284 rows
- Not real time: Model complexity is very high and it is useful for predicting mortality in 3months to 1year timeperiod.
- Dynamic and accounts temporal variations
- Not incremental and not interpretable due to use of the black box model.

2.2 C-LACE : computationalmodel to predict 30day post hospitalization mortality.

- Model : Random forest
- Two models : one with 20 attributes any another with 308 attributes
- Not real time and not incremental
- Does not account for temporal variations and is not dynamic
- Not interpretable in nature.

2.3 Early hospital mortality prediction using vital signals :

- Model : Decision trees
- Highly interpretable in nature
- Uses vital sings alone and doesn't include other clinical variables , so very limited in terms of utility.
- Accounts for temporal variations is vital signs and is dynamic
- Not real time and not incremental

2.4 Issue: Visually interpretable deep learning for mortality predication inside the JEU

- Model: Convolutional neural network.
- Provides game theory based explanation for features importance.
- Handle temporal variable and is dynamic
- Model complexity is very high
- Not interpretable
- Not real time and not incremental

2.5 Real time mortality R is K predication.

A convolutional neural network approach.

- Model : Convolutional neural network.
- Real time prediction
- Uses heart rate , blood pressure and respiratory rate alone for Prediction.
- Dynamic is nature and handles temporal variations
- Does not handle data imbalance and uses sampling to create balance.
- Not interpretable and not incremental.

3. RESULT ANALYSIS

This table shows the comparison of different types of algorithm for mortality prediction.

Model	Data Imbalance	Interpretable	Real time	Dynamic - Temporal	Incremental
B1 - Improving palliative care with deep learning	yes	no	no	yes	**no**
B2 - C-LACE: Computational Model to Predict 30-Day Post Hospitalization Mortality	yes	no	no	no	**no**
B3 - Early Hospital Mortality Prediction using Vital Signals	yes	**yes**	no	yes	**no**
B4 - ISeeU: Visually interpretable deep learning for mortality prediction inside the ICU	yes	Yes but complex	no	yes	**no**
B5 - Real Time Mortality Risk Prediction: A Convolutional Neural Network Approach	no	no	**yes**	yes	**no**

4.CONCLUSION

Big Data has a great potential changing the healthcare outlook such as in drug discovery, patients personalization care, treatment efficiency, improvement in clinical outcomes and patients safety measures. Patients admitted to the ICU suffer from critical illness or injury and are at high risk of dying. ICU mortality rates differ widely depending on the underlying disease process, with death rates as low as 1 in 20 for patients admitted following elective surgery and as high as 1 in 4 for patients with respiratory disease.

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