Literature Survey

1.Ayman Alahmar and Rachid Benlamri"Optimizing Hospital Resources using Big Data Analytics with Standardized e-Clinical Pathways" in DOI 10.1109/DASC-PICom-CBDComCyberSciTech49142.2020.00112,IEEE 2020

Paper Description:

Clinical Pathways (CPs) have been created as a novel healthcare managing plan that contains all the steps in treating and following-up patients. CPs, as such, are capable of generating the big data needed to fuel IT and data science applications in healthcare. CPs aim to reduce variations, optimize the use of resources, and improve the quality of care. CPs also ensure patient safety because they contain agreed-on clinical practice guidelines and protocols.

Merits:

This work proposes a solution that

1. Optimises the usage of resources

2. Reduces cost

3. Reduces length of stay in hospitals

4. Increases patient satisfaction

Demerits:

1. No new insights were gained from the available data

2. The method does not use any pre-processing technique and thus handling of such large amount of data becomes complex.

2. M. Ambigavathi and D. Sridharan"Big Data Analytics in Healthcare" IEEE,2018

Paper Description:

Big data analytics tools play an essential role to analyze and integrate large volumes of structured, semi structured and unstructured vital data rapidly produced by the various clinical, hospitals, other social web sources and medical data lakes. However, there are several issues to be addressed in the current health data analytics platforms that offer technical mechanisms for data collection, aggregation, process, analysis, visualization, and interpretation. Due to lack

of detailed study in the previous literature, this article inspects the promising field of big data analytics in healthcare. This article examines the unique characteristics of big data, big data analytical tools, different phases followed by the healthcare economy from data collection to the data delivery stage.

Merits:

    1. Proposes solution for pre-processing data present in various forms

    2. Represents complex medical information into easily understandable form using diagrams, text and symbols.

    3. Data interpretation technique to make various predictions are proposed.

Demerits:

    1. Not a large number of analytics results are considered.

      2. Only a limited number of factors are considered.

    3. Data interpretation is done only using the raw data available.

3.NADA Y.PHILIP and SUCHETHA. M "A Data Analytics Suite for Exploratory Predictive, and Visual Analysis of Type 2 Diabetes" in IEEE February 7, 2022.

Paper Description:

Data science in healthcare has the potential to identify hidden knowledge from the database, re-confirm existing knowledge, and aid in personalizing treatment. In this paper, we present a suite of data analytics for T2D disease management that allows clinicians and researchers to identify associations between different patient biological markers and T2D related complications. The analytics suite consists of exploratory, predictive, and visual analytics with capabilities including multi-tier classification of T2D patient profiles that associate them to specific conditions, T2D related complication risk prediction, and prediction of patient response to a particular line of treatment. The analytics presented in this paper explore advanced data analysis techniques, which are potential tools for clinicians in decision-making that can contribute to better management of T2D.

Merits:

     1. Proposes analytics suite consisting of exploratory, predictive and visual analytics with capabilities including multi-tier classification.

     2. Proposes a decision making methodology to make decisions using analysed results.

Demerits:

     1. Only small dataset is considered.

     2. The model is not robust.

4. Yan Ye, Zhibin Jianga, Xiaodi Diaoc, Dong Yanga and Gang Dua" An ontology-based hierarchical semantic modeling approach to clinical pathway workflows" in 2009 Elsevier Ltd.

Paper Description:

An ontology-based approach of modeling clinical pathway workflows at the semantic level for facilitating computerized clinical pathway implementation and efficient delivery of high-quality healthcare services. A clinical pathway ontology (CPO) is formally defined in OWL web ontology language (OWL) to provide common semantic foundation for meaningful representation and exchange of pathway-related knowledge. A CPO-based semantic modeling method is then presented to describe clinical pathways as interconnected hierarchical models including the top-level outcome flow and intervention workflow level along a care timeline.

Merits:

- Enables explicit, structured semantic descriptions of the case pathways during other days and of other real clinical pathways for specific clinical conditions in the same way.

- Provides reusability, flexibility, and efficiency of semantic descriptions for all clinical pathways through the combination of different levels of knowledge.

Demerits:

- Clinical pathway modeling is fundamental to a web-based system that efficiently supports automatic management of any clinical pathway. But the system requires a general modeling method describing all the pathways.

- Faced with increasingly diverse health demands and fierce competitions, healthcare organizations are embracing clinical pathways

5. Ayman Alahmar, Emad A. Mohammed, Rachid Benlamri "Application of Data Mining Techniques to Predict the Length of Stay of Hospitalized Patients with Diabetes" in IEEE 2018

Paper Description:

Diabetes is one of the most critical public health conditions worldwide. It has been shown that patients with diabetes are associated with a longer length of hospital stay (LOS) and increased associated healthcare cost. The uncertainty of diabetic patients' LOS makes it difficult for hospitals to optimize their scheduling process. Here applies the stacked ensemble method, with deep learning as the meta-learning algorithm, to predict long vs. short LOS for diabetic patients. The obtained results show that stacked ensemble technique is promising in this field because stacking multiple classification learning algorithms resulted in a better predictive performance than that obtained from any of the constituent learning algorithms.

Merits:

- Reasonable estimate on LOS for patients with diabetes helps in optimizing the use of hospital resources, reducing healthcare cost, and improving diabetic patient satisfaction.
- Motivated by the importance of predicting LOS for diabetic patients, this aims at developing a predictive model that can predict LOS for patients having diabetes as an existing condition.

Demerits:

- LOS has long been a crucial metric of hospital quality of care and efficiency. Longer stays result in unorganized scheduling for hospitals and higher costs for patients and their families.
- Patients with diabetes are associated with a Longer length of hospital stay (LOS) and increased associated healthcare cost. The uncertainty of diabetic patients' LOS makes it difficult for hospitals to optimize their scheduling process.

6. Yan Ye, Zhibin Jiang and Gang Du"A Knowledge-Based Variance Management System for Supporting the Implementation of Clinical Pathways" in IEEE 2009

Paper Description:

A knowledge-based variance management system that is developed using object-oriented analysis and design techniques, especially unified modeling language (UML), and implements effective analysis and handling of various variances through the construction and fuzzy reasoning of generalized fuzzy ECA (GFECA) rules and typed fuzzy Petri net extended by process knowledge (TFPN-PK) models related to the clinical pathway ontology and healthcare domain ontology. Abstract Variance management is important for computerized implementation of clinical pathways (CPs) to dynamically execute patient care processes and effectively provide high quality and efficient healthcare services. However, current related efforts are not adequate to support variance handling process involving two decision strategies, imprecise knowledge and the interaction with standardized CP workflow.

Merits:

- The system is a subsystem of the CP workflow system realizing dynamic execution and monitoring of CP-based patient care processes and can effectively facilitate the handling of different types of occurred variances by supporting integrated representation and reasoning of relevant fuzzy/non fuzzy knowledge.

- Abstract-Variance management provides high quality and efficient healthcare services.

Demerits:

- CPs are mainly implemented in traditional paper-based manual way, which has several inherent deficiencies impairing total implementation effectiveness, such as difficulty in real-time monitoring CP-based care workflows and systematically collecting and analyzing relevant information.