A Distinct Algorithmic Approach in the Field of Health Care

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***Abstract*—E-Healthcare systems has been rapidly growing day by day with the evolution of new concepts and inventions for safeguarding clinical details and for providing advanced treatment to patients using data mining techniques and in the field of federated healthcare related databases. Nowadays with the advancement in technology, different techniques and algorithms can be used to treat patients in a more efficient manner. This paper presents a overall contemplate of different algorithmic approaches in health care systems.**

***Index Terms*—Health care, Clinical details, Federated databases, Generalization, Anonymization.**

I. INTRODUCTION

E-Healthcare systems monitors the patients health condition regularly also maintain and track the patients clinical details periodically and in chronological wise, In order to provide the most effective and relevant treatments mining the clinical data and using different algorithms provide better solution to overcome the existing errors[1]. As the amount of collected health data is increasing significantly every day, a strong analysis tool and algorithm that is capable of handling and analyzing large health data is essential. The applications of data mining in the field of healthcare, advantages of data mining techniques over conventional methods, special characteristics of clinical data, and new health condition enigmas have made data mining very necessary for health data analysis. So a set of algorithmic approaches and different techniques are presented in this paper.

II. ALGORITHMS AND TECHNIQUES

The clinical statement interoperability of two different electronic records is derived by using same reference information model method. It can be mapped using archetypes. This enables finding of equalities between source and target clinical records [2]. Finally by generated mapping definitions an instance of the transformation of health level seven statements can be derived.

Also the access policy based system is adopted for generating the clinical document architecture for the patient by using context aware policy specification language which allows encoding with privacy and disclosure policy rules are presented [3].

The availability of clinical data favours scientific advance through the creation of repositories for secondary use. Data anonymization has become a mandatory technique [4]. A service for pseudonymization of clinical data aimed at easy exchange of clinical information for secondary use in compliance with legislation on data protection is presented.

The another algorithmic technique is data swapping [6] in which the data across different clinical information are swapped and the main advantage is the lower order data is completely preserved so that aggregate computations can be accurately performed without violating the privacy of data.

III. SCRUB, DATAFLY AND PROBABILISTIC DATA MATCHING METHODS

The scrub system was designed for de-identification of clinical notes and letters which occurs in the form of textual data. This scrub system uses various detective algorithms and local knowledge sources which compete with each other based on the certainty of findings.

The datafly system was developed to prevent the identification of the subjects of medical records which may be stored in multidimensional format. It is developed in response to the concern that the process of removing only directly identifying attributes. This approach works by setting a minimum bin size for each field.The anonymity level is defined with respect to this bin size.
The values in the records are generalized to the ambiguity level of the bin size as opposed to exact values. The overall anonymity level is defined between 0 and 1which defines the minimum bin size for each field. The level 0 indicates the original data whereas the level 1 indicates the maximum level of generalization of the underlying data. The generalization in this datafly systems is done independently at the individual attribute level, since the bins are defined independently for different attributes.

The probabilistic data matching method adopts likelihood ratio theory to assign comparison to the correct or more likely decisions. This method can be used when same symptoms matches for two or more different diseases and the relevant data analyzed against the existing information with the available matches on the basis [5]. The physicians can able to determine the best possible disease match and can create the accurate treatment plan for the best possible treatment to the patients.

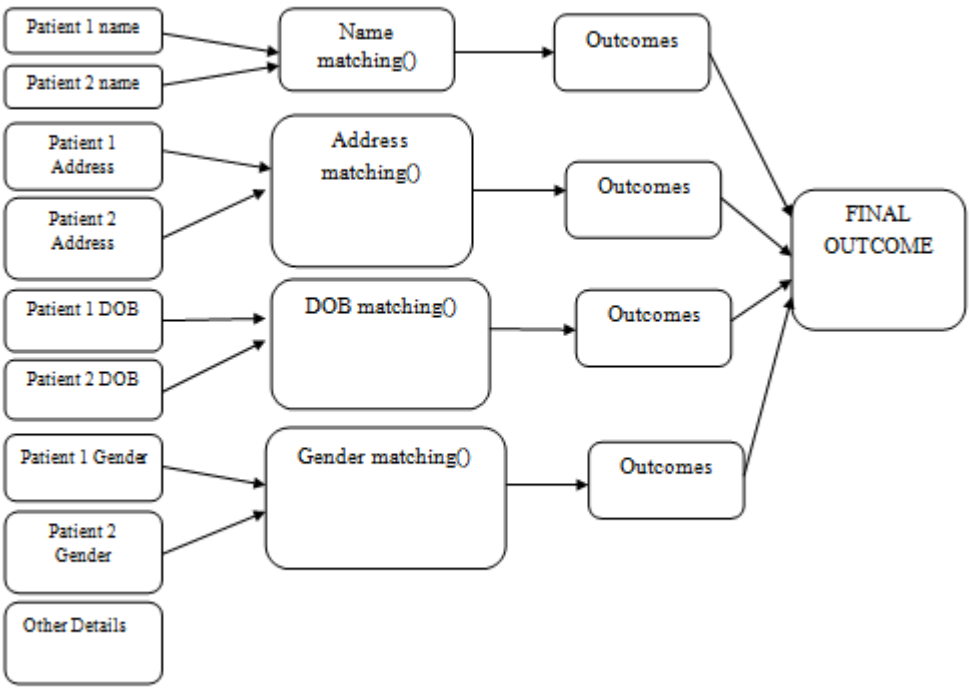

Figure 1: Probabilistic Data Matching Model- Method

IV. M LANGUAGE FOR HEALTH CARE AND SLICING ALGORITHM

M Language is the utility multiprogramming language exclusively made for healthcare industry. This enables computers to run multiple programs simultaneously [5]. Slicing algorithm partitions the dataset both horizontally and vertically. Vertical partitioning is done by grouping attributes into columns based on the correlation among attributes. Horizontal partitioning is done by grouping tuples into buckets. Finally within each buckets, values in each columns are randomly permutated or sorted to break the linking between two different columns. The main idea of this algorithm is to preserve association.

V. SAMPLING AND PROPORTIONAL INTEGRAL DERIVATIVE AND COMPUTATIONAL PHENOTYPING

Sampling is a method of examining a few selected items instead of a very large number of units. The smaller unit is called sample and the larger unit is called population. There are various sampling techniques.

Simple Random Sampling is the process of studying a larger population. Each individual sample is randomly chosen and each and every unit has a chance of getting selected.

Systematic Sampling is the process of selecting a larger group sample from a random starting point to a fixed periodic interval known as the sampling interval.

Stratified Sampling is the process of dividing the population into several groups called “strata”. Then the conclusion is arrived based on the possibilities.

Clustering sampling is used when heterogeneous groups are present in the statistical population. The groups are divided into sub groups for which the sampling is performed.

The proportional integral derivative is mainly used in cardiac analysis to identify the mean arterial pressure of a patient and the data is managed by a computer which has digital version of the PID controller algorithm. This algorithm has a control feedback mechanism which reduces the significant differences between the desired and expected outcomes. It also controls the infusion of vasodilating agents and helps hypertensive patients after surgery.

Computational phenotyping provides clinically useful description of various diseases [7]. It also provides the set of observable characteristics of a patient health condition resulting from the interaction of genotype with the environment and the inferred phenotype is computed and put into use for obtaining predictive models for diseases.

VI. CONCLUSION

With the advancement in the medical industry, the impact of medical algorithms in the field of health care is tremendously increasing in such a way that nowadays the doctors and physicians can able to determine exactly even where to point lasers for maximum impact and minimum collateral damage to the patients while performing surgical operations thus paved the way for treating patients more effectively and significant increase in the average life span of humans in the world.

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