Deep Analysis of National Health Data Warehouse Bangladesh: Privacy Issues and a Practical Solution.

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Abstract—Integration of patient data in a national data warehouse can be very useful to discover hidden knowledge. If we want to integrate all the patient data in a data warehouse from different healthcare organizations database, it will be very important to hide the identifiable patient data to ensure patient privacy. The record linkage system can be used to integrate data from heterogeneous sources. This paper proposed a system to develop the national data warehouse with ensuring privacy and security of the patient data. This paper produce encrypted mobile number, gender and name-value of patient to produce patient identification key.

Index Terms—Health Data; Data Privacy; Health Data Warehouse; Record Linkage; Data Mining

I. INTRODUCTION

Nowadays data are the most important weapon to lead the world. Using data mining technique, we can discover hidden knowledge which can be applied to diverse area such as business, healthcare sectors, engineering, and social media [41], [42]. For effective data mining, development of data warehouse(DW) is required. A data warehouse is a collection of data to support management decision [43]. So in a health data warehouse the health related historical data are stored. With the development of information system medical database system are developing in the healthcare organization of Bangladesh. They are storing patient information which can be very useful to apply data mining technique and discover the hidden knowledge. So all the healthcare organization data need to be stored in a warehouse for the national research purpose. For developing a data warehouse integrating all the health records from the different sources is necessary. Record linkage is the process of identifying similar records from the different information systems which belongs to the same real world entity. Similarity of two records is based on domain-specific similarities over individual attribute constituting the record [4] [6]. So record linkage is very important to find out the correlation among diseases from medical dataset. If health dataset is integrated using record linkage means patient privacy at risk. So maintaining individuals privacy while integrating patient data is an important research issue. This paper [5] proposed a technique to integrate medical data in a data warehouse using record linkage which anonymize the identifiable patients private data. This approach will be suitable for a developing country like Bangladesh. The rest of the section is organized as follows. In Section II we will discuss about the positive think and the proposed technique of this paper [5]. Section III describe about the weakness of the paper [5] and in section IV will conclude the discussion.

II. POSITIVE THINK

This paper has discussed about the security and privacy risk of integrated healthcare information system raised worldwide. Why the medical data are getting thread and where the hacked data are using has discussed in this paper. This paper also proposed a system to anonymize the patient identifiable data while integrating the data from different sources. In this technique patient mobile number will be encrypted then using encrypted mobile number, Geo-Code, Name-Value and date of birth of the patient a Patient Identification Number(PIK) will be produced and replaced by the patient all identifiable information in the database. This paper mentioned some reason of using Mobile based identification like 78.3 percent people of Bangladesh use mobile phone, almost every rich or poor family have mobile phone, easy to remember, uniqueness etc. Name-value is used because father and children have same mobile number and Geo-Code but their name values are different. In developing countries like Bangladesh many people do not know their date of birth. So in many diagnostic center only patient age is collected. From the age data patient age can be calculated very easily.

III. WEAKNESS

The main problem with mobile based identification is many people use multiple mobile number. Same person provides different number in different hospital, so multiple record for same patient can be stored. Another problem is mentioned in this paper is changing the mobile number of the patient.

IV. CONCLUSION

To ensure quality health service and research medical data warehouse need to be developed. In developing data warehouse, the privacy and security of the patient need to be concerned. This paper proposed a system where medical patient data can be integrated with ensuring to anonymous the identifiable private data of the patient. Although having some weakness this proposed system can be very effective for developing medial data warehouse in a developing country.
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