



Medically E-Prescription Diagnosis Integration

Omkar Malwadkar ¹, Vishwas Latkar ², Suhas Jagdale ³, Suyash Mule ⁴, Prof. Priyanka Kedar ⁵

U.G. Student, Department of Computer Engineering, Dhole Patil College of Engineering, Pune, Maharashtra, India¹

U.G. Student, Department of Computer Engineering, Dhole Patil College of Engineering, Pune, Maharashtra, India²

U.G. Student, Department of Computer Engineering, Dhole Patil College of Engineering, Pune, Maharashtra, India³

U.G. Student, Department of Computer Engineering, Dhole Patil College of Engineering, Pune, Maharashtra, India⁴

Asst. Professor, Department of Computer Engineering, Dhole Patil College of Engineering, Pune Maharashtra, India⁵

ABSTRACT: Prescription in health sector has more important as it gives details and clear health ideas about the patients. The manual prescription has the limitations and it affects the health of the patient as well as hectic work for the doctor. The proposed system we developing is basically on the digital availability of health record. The system designed user friendly as it helps to the digitization of health record of patient which gives availability of centralized health record as well as E-prescription which serves the people who lives in rural as well as remote areas. The illiteracy is the major issue which affect the people that not capable to understand the important of prescription and health record. The proposed system helps to the patient directly that they don't need to maintain the paper record for the diagnosis as the health record is available. The system which uniquely identified the patient as it has fingerprint recognition. The finger recognition and biometric identification system makes the system unique. The UIDAI (ADHAR) also linked with the system that helps to patient who specially relay on government schemes. The patient can be added and updated under the doctor that can be access previous health records and add new prescription if needed. The Patient can also be able to access health and prescription record in the read only format and also from the medical history we can calculate the statistics such as undernourishment children report, pregnant women report, various disease report and also we maintain the stock availability report.

KEYWORDS: medical data, rural area, biometric (fingerprint recognition) technology, centralized availability, stock maintenance, statistics report.

I. INTRODUCTION

E-Prescribing systems have a clear prospect for better and competitive ways of dealing with the health sector, yet it is necessary to be very careful when choosing systems. Implementations are in their initial stages so there tends to be a lack of standards guiding the action of obtaining functional specifications. There are likely advantages but little data to support this assertion. 'Electronic prescription' is a computer based application which utilizes the internet to create, broadcast and fill out a medical prescription form. It is substitute of paper based prescription. Anyone from the medical industry i.e. a doctor, a nurse or a medical assistant can send a prescription online to the centralized system. It results without errors, precise and comprehensible a prescription. In rural area, the existing mechanism in storing those data is written down to the book. It is difficult to share and recap the data if still in the book. In order to store and make use of the health and medical data it is should be provide digital record system. The digital record system at least supported with record medium and device for data transfer. Record medium needs to be specified because the data is shareable for the doctor. MEDI is an alternative for record medium but should be integrated with the device for data transfer operation. In rural area that there was limitation of electrical power supply and due the mobility of the doctor activities, the device should compact and has low power consumption so fingerprint recognition and centralized system (MEDI) concept is developed for some of those conditions. The main function of fingerprint recognition and centralized system



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is transferring data to centralized system. MEDI system also should support to ensure the data integrity and validity. This MEDI system concept typically developed based on requirement on fields.

II. RELATED WORK

- 1) Manual paper base prescription system- this system is related with the paper base availability of patients prescription, as in the government hospital the patients data or record is maintained on the paper which contains many limitations such as, Duplication of records, Requires paper and coping supplies, Accessibility of medical records-only one person at a time may use the chart, Quality of manual medical record-the paper is fragile and does not last permanently etc
- 2) Electronic prescribing [1] is alternative to the current method of manually written prescriptions in hospitals. It has many benefits for those prescribing and dispensing medicines and also for the maintenance of medical record the complexity of use of medications has increase enormously leading to a greater risk of errors. E-prescribing is less prone to error it provides a better and more reliable source of information of patients it saves staff time and improves it also reduces the time spent by re-writing the charts of prescription and much more but it also contains some limitations such as, Financial expenses, risk operator on investment much be consider there are expenses related to buying putting into practice sustaining such as application, many small hospitals and clinics may not be able to sub tend such expenses, organizations will have to get appropriate hardware and software to properly applying the system so organization has to bear the cost, training and knowledge important to operate the system software, training may be expensive, user might make mistakes by entering the wrong data, applications requires continuous monitoring and feedback from experts.
- 3) Health and medical data is important as like the health record and prescription given by the doctor [5]. In the rural area the health record storing and maintenance is done manually written in book and health register. It difficult to search record and summarize the data so it encourages storing the data in digital format. The smart card is an alternative solution for the digitization of data. The rural area has limitations like electrical power supply and availability of expert doctor, so due to mobility of doctor's activities the device should be compact and should has low power consumption. So that mobile data collection system (MDCS) developed for transferring data to smart card and to health information system. The limitations of the above system is it required smart card reader of particular standard to read that card which is limited to particular smart card only, smart card which used can be break after some time and also there will be chances of losing the card. It limits the health services provide to the patient and also it.

III. PROPOSED SYSTEM

This paper presents a proposed system which is the web application that has a small contribution towards making digital India. Web application and technologies are platform independent. System designed primarily for devices such as smart phone, tablets and personal computers. The proposed system will be developed for all the devices which support web services. The literacy ratio in rural area like MELGHAT is 44% by the study of different NGO's. The main objective behind this paper is to design the web application which would provide an effective and easier way to maintain patient's e-prescription and record and reduce the overhead of manual documented prescription given by doctors. This web application also has a major contribution towards maintaining privacy of patient's prescription information. This paper is designed keeping in mind the cost, ease of use, less overhead for target users like doctors, new practitioners and patients. To reduce the cost, we are designing this web application for all smart devices, so that doctors, new practitioners and patients could afford it. This web application is designed in such a way that it is easy to use, has less overhead of manual documented prescription and maintaining patient's record manually. The another advantage of using this web application is that doctors can access the all the medical records of patients and patients also track or access medical records in read only format from any place as the data would be stored on centralized system and it could be accessed from anywhere any time. Also it can maintain patient's history that can be used in future. This web application contains biometric thumb recognition technique with centralized availability of patient's data. It also maintains statistics of pregnant women and malnutrition children's especially in rural area. This statistical data will be helpful for the NGO's and government to improve the health of unhealthy area like MELGHAT.

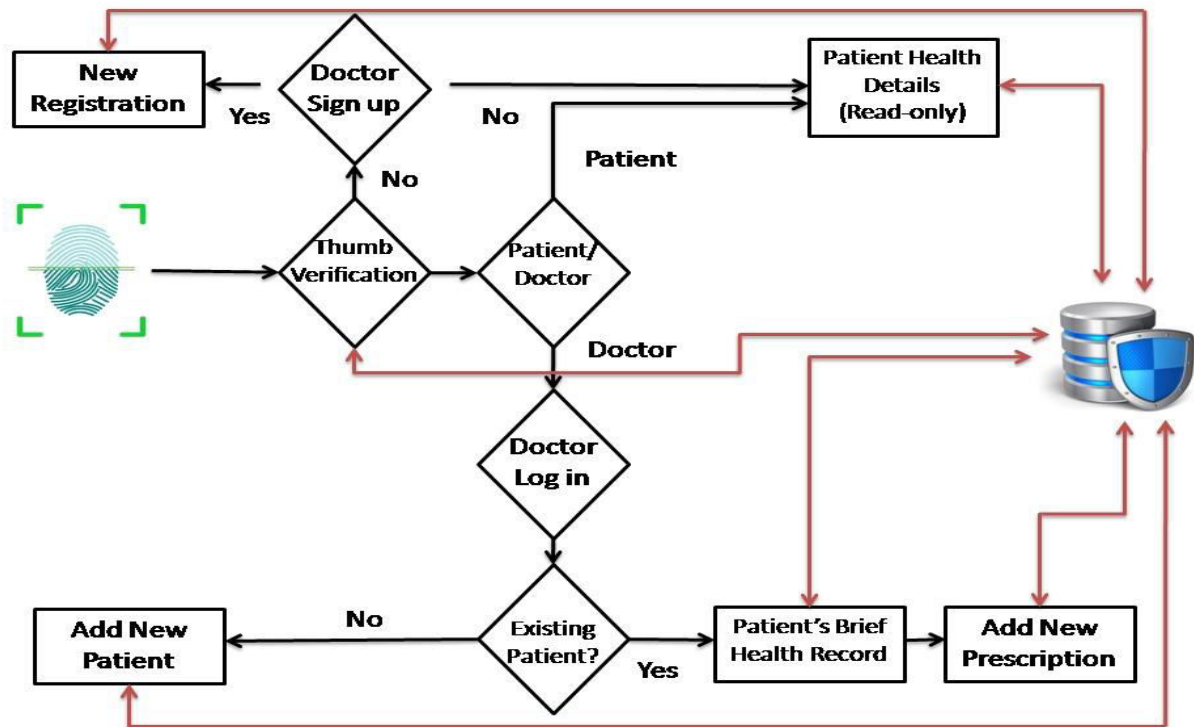


Fig.1: System Architecture.

1) Flow of Proposed System:

Flow chart or Activity diagram shows the actual flow of the proposed system. How system will work according to module which will be defined in the activity diagram and we will get the actual idea about the system flow as shown in fig 2.

2) Use Case of Proposed System:

Use case diagram gives the basic idea about the actor or user who will going to use the MEDI system along with their work include (Necessary) and exclude (non-necessary) relationships. Use case diagrams are usually referred to as behavior diagrams used to describe a set of actions (use cases) that some system or systems (subject) should or can perform in collaboration with one or more external users of the system (actors). Each use case should provide some observable and valuable result to the actors or other stakeholders of the system. The purpose of the use case diagrams is simply to provide the high level view of the system and convey the requirements in layman's terms for the stakeholders. Additional diagrams and documentation can be used to provide a complete functional and technical view of the system. Fig 3 shows the use case diagram of proposed system.

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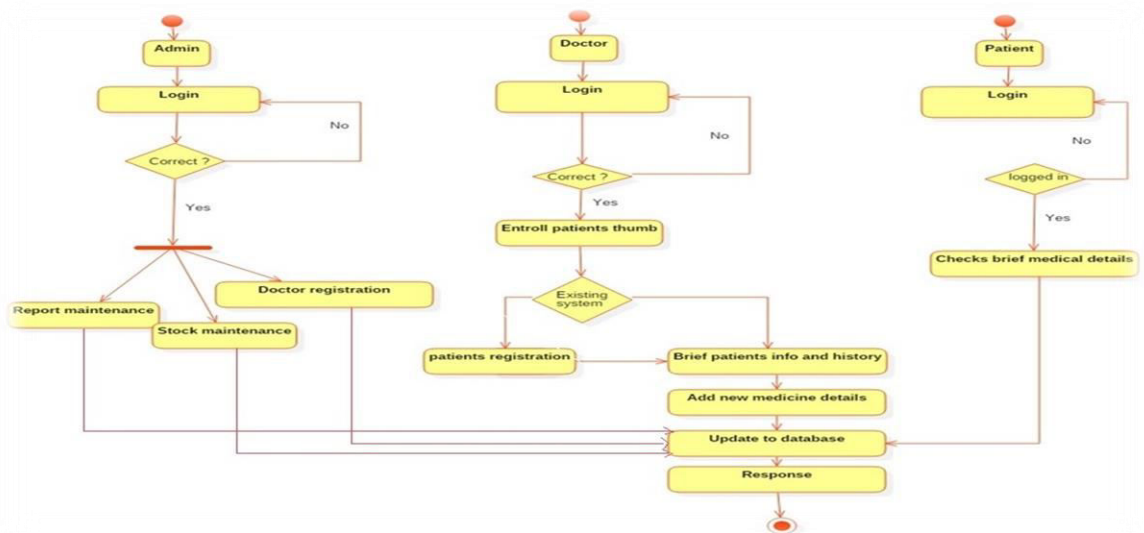


Fig.2: Activity Diagram.

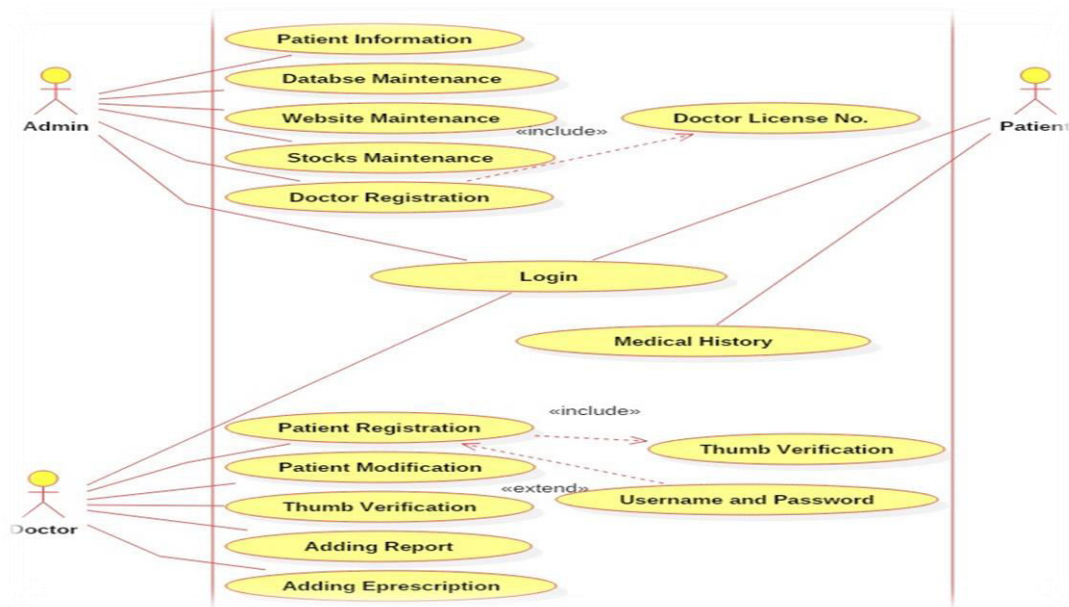


Fig.3: Use Case Diagram.

3) Modules of Proposed System:

I) Administrator: The proposed system has the super access of all the modules which comes under the administration. The admin can register the new doctor after registration request and give access. Admin also maintain the statistics and report of patient health record as well as pregnant women and malnutrition children.

II) Doctor: In the proposed system doctor have access to add new patient and check whether it existing patient or not and add new if patient not exist. Doctor register to the system itself if doctor is new and the update of health records and addition of E-prescription done by doctor.

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III) Patient: The patient has access of health record updated and E-prescription given by the doctor. The health record and E-prescription available for access to patient in the read only format.

IV) Maintenance: Under the maintenance we are maintaining the stock and Report maintenance so that it will reduce the man power required for current existing system. The following are the categories under in the Maintenance Module:

- Stock Maintenance:** In the proposed system stock maintenance can be maintained under the Admin login. Admin have to first log in the account so he can access the data of Stock. Under the stock. Maintenance admin can check the availability of the stock.
- Report Maintenance:** In the proposed Report maintenance can be maintained under the Admin login. Admin have to first log in the account so he can access the data of all diagnosis report. Under the report Maintenance admin can find the statistics of malnutrition child report, disease report and pregnant women report.

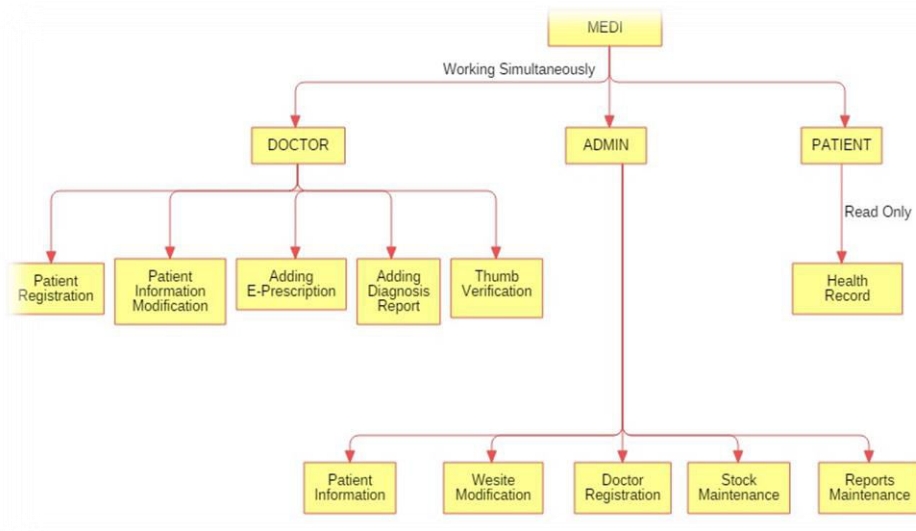


Fig 4: Modules of the proposed system.

4) Technology Used:

Backend: (Advanced JAVA)

- Spring Boot-Web
- Spring IOC
- Spring Security
- REST Controller Spring Boot-Web
- MYSQL with Liquibase
- Gradlew
- Spring Data
- Spring JPA Repository

Frontend

- Angular 2.x.x & 4.x.x
- Node Js
- CSS

IV. TESTING PHASE

The main of testing includes system execution with the intent to find any error, unfulfilled requirement, gaps and bugs in the system. The primary and broad objective of testing is to find the defects in software before customer finds them. There are mainly 2 types of manual testing which we are going to use in the proposed system they are as follows:

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Unit testing: - Unit testing is method where individual units of source code are tested after their completion. Unit is the smallest testable part of any system. It can be procedure, individual function or an entire module.

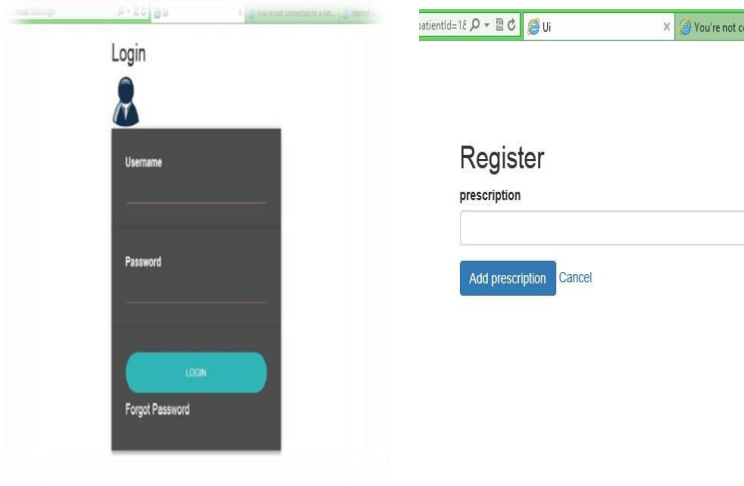


Fig.4: Unit testing result

Integration Testing: - The process of integrating the components and implementing the interaction between them called Integration. The verification and testing of integration is called as integration testing. In our proposed system after login successfully the dashboard page will be open that is nothing but the integration testing.

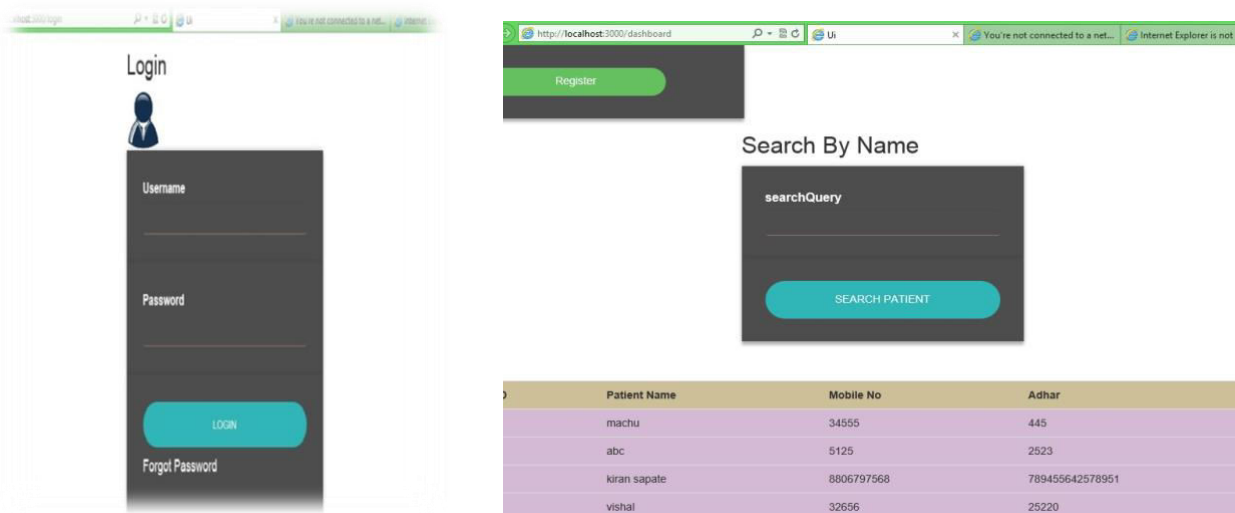


Fig 5: Integration testing result.

System Testing: - When the testing is performed on complete integrated system capable of performing all the intended operation the testing is called as system testing.



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V. SIMULATION RESULTS

The result section of the system shows that the actual performance of the system in certain circumstances. The result can be calculated by the comparing the existing system as well as the configuration of the system required for the system execution. The result is also the actual difference between the results of the existing system which can be comes with the errors and bugs. The result of new system is mainly the problems that overcome in new developed system and the result must be as fast as possible as compared.

The below table fig.6 shows the result which is calculated from the utilization of the resources or the system by the proposed system. The actual utilization of the system clears the working of the proposed system in terms of software required for the proposed system i.e. as given in the table below,

- CPU Utilization:-

CPU Utilization (Average)	
Google Chrome	2%
Xampp Control 32 bit	1.6%
Node Js :Server Side java Script	0.5%

- Memory Utilization:-

Memory Utilization	
Google Chrome	84.48MB
Xampp Control 32 bit	12.86MB
Node Js:Server Side java Script	30.74MB

Fig.6: CPU and Memory utilization.

The below table fig.7 shows the result which is calculated from the utilization of the disk and network utilization required for the proposed system. The disk utilization of the system plays an important role, the minimum utilization of the disk helps for fast execution, functioning as well as result of the proposed system.

- Disk Utilization:-

Disk Utilization	
Google Chrome	49.11 MB
Xampp Control 32 bit	25 MB
Node Js :Server Side java Script	20MB

- Network Utilization:-

Network Utilization	
Google Chrome	200 Byte/sec
Xampp Control 32 bit	180 Byte/Sec
Node Js :Server Side java Script	300 Byte/sec

Fig.7: Disk and Network utilization.



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V. CONCLUSION

In this paper we describe how manual prescription can be enhanced to electronic prescription. This will help to reduce the overhead of manual documented prescription given by doctors. Moreover it will help to maintain patient's e-prescription and health record efficiently. It will also enhance the patient's knowledge as well as availability of health record by the centralized access of data. The system described in this paper is basically designed keeping centralized availability of patient's health record. This paper is designed keeping in mind the cost, ease of use, less overhead for end users like doctors, new practitioners and patients. This paper produces the web application where there are no chances of misunderstanding of medicine names as they are not handwritten and is easily understood.

REFERENCES

1. Shamim Ayaz, Athar Naqvi and GeofBranch. "The Role of E-Prescribing in Health Care." A Case Study of Newham University Hospital. (2015)
2. Ducker, M., and Sanchez, C. "Pros and Cons of E-Prescribing in Community Pharmacies." (2013)
3. Kohn, Linda T. "E-Prescribing: CMS Should Address Inconsistencies in Its Two Incentive Programs That Encourage the Use of Healthy Information Technology." DIANE books (2011)
4. Miller, C., Patel, V. and Kaushal, R. "Socio Technical Challenges To Developing Technologies For Patient Access To Health Information Exchange Data." Journal of the American Medical Informatics Association. . (2014)
5. "Smart Card Mobile Data Collection System Concept for Health and Medical Data Collecting Activities in Rural Area" Van Ornum, M. "Electronic Prescribing: A Safety and Implementation Guide. Jones & Bartlett Publishers" (2008).
6. Mouad .M.H.Ali, Vivek H. Mahale, Pravin Yannawar , A. T. Gaikwad, "Overview of Fingerprint Recognition System." International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) – 2016.
7. Anil K. Jain, Life Fellow, IEEE, Sunpreet S. Arora, Student Member, IEEE, Kai Cao*, Lacey Best-Rowden . "Fingerprint Recognition of Young Children." (2016)
8. "Medical Records Manual" A guide for developing Countries by World Health Organization (2006)
9. <https://www.healthit.gov/providers-professionals/case-studies-data>.
10. Miller, C., Patel, V. and Kaushal, R. "Socio Technical Challenges To Developing Technologies For Patient Access To Health Information Exchange Data. Journal of the American Medical Informatics Association." (2014).
11. Unique Identification Authority of India, "Capturing Infant Biometrics in Aadhaar," http://uidai.gov.in/images/news/corrigendum_notification_for_workshop_on_capturing_infant_biometrics_in_aadhaar_052016.pdf, June (2016).
12. W. J. Herschel, "The Origins of Fingerprinting". Oxford University Press, (1996)