Proposal of centralized electronic health record for developing mhealth in India

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Abstract: The medical services are most important services for all of us and majority of the population all over the world mainly developing countries and the rural areas where there is an acute scarcity of the specialists and health services and health care providers. So the wireless health technologies will be achievable in rural areas but records are of paper type which are having the chances of getting lost and are available at different places. So this brings in the need for centralized records system that are called electronic Health Records.In this paper we are focusing on mHealth technologies and providing epr on handhelds In this paper we will be focusing on the concept of centralized health record for every citizen of India in providing health services to the people. In this paper we will be focusing on developing electronic health records of every citizen of India and make it available to every registered doctor of India The use of electronic health records offers significant benefits in health care units. Direct access to patient history, lab test, reports, and imaging from the point of care eliminates the delay required for medical attendants to dispatch and retrieve records from distant locations.

Keywords: EHR, EPR, mhealth, ehealth

I Introduction

India

India is a country in South Asia. It is the seventh-largest country by geographical area, the second-most populous country with over 1.2 billion people, and the most populous democracy in the world. It has 28 states and 7 union territories. It has 335 fully recognised medical colleges in the country. 70% of Indian lies in villages. There are 638,596 villages in India.

Medical colleges in India

<table>
<thead>
<tr>
<th>State</th>
<th>Government medical colleges</th>
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<tbody>
<tr>
<td>AP</td>
<td>14</td>
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<tr>
<td>ASSAM</td>
<td>2</td>
</tr>
<tr>
<td>BIHAR</td>
<td>4</td>
</tr>
<tr>
<td>CHATTISGARH</td>
<td>1</td>
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<td>GOA</td>
<td>1</td>
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<tr>
<td>GUJRAT</td>
<td>13</td>
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<tr>
<td>HARYANA</td>
<td>1</td>
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<td>HP</td>
<td>2</td>
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<td>J&amp;K</td>
<td>1</td>
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<tr>
<td>JHARKHAND</td>
<td>2</td>
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<tr>
<td>KARNATAKA</td>
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<td>KERALA</td>
<td>9</td>
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<tr>
<td>MANIPUR</td>
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<tr>
<td>UTTAR PRADESH</td>
<td>13</td>
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<tr>
<td>MAHARAstra</td>
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<tr>
<td>MP</td>
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<td>MEGHALAYA</td>
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<td>NEW DELHI</td>
<td>7</td>
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<tr>
<td>ORRISA</td>
<td>5</td>
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<tr>
<td>PONDICHERRY</td>
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<td>PUNJAB</td>
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<td>WEST BENGAL</td>
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<td>UTTRAKAND</td>
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<td>RAJASTHAN</td>
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<td>SIKKIM</td>
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<td>TAMIL NADU</td>
<td>11</td>
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<tr>
<td>TRIPURA</td>
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</tr>
</tbody>
</table>

II mHealth

mHealth is a part of telemedicine. As use of mobile is increasing in the society. The number of mobile user is nearly five billion in this world. Sixty four percent of the mobile user lies in the developing countries, mHealth system will provide specialized medical services to remote areas, tele-consultation on the move, and on-line
telemedicine services. An m-Health system is intended to provide medical services any time anywhere mainly in the developing countries. The m-Health system combines biomedical instruments with advanced telecommunication systems where PBIs based on low power mixed signal microcontroller and wireless devices allow medical staff with basic training to install and record the vital signals of patients on remote locations, on the move and at small clinics for on-line tele-consultation. Here we are using mobiles, smart phones, PDAs, tablet PCs, laptop etc. for providing medical facilities in the developing countries. The m-Health services will be available to the patients depending on demanded services, locations and availability of telecommunications systems.

![Telemedicine Diagram](image)

**III Paper Health Records**

In various areas in country we are using paper base health record system. Many of the patients lost there disease history and health reports.

- It is difficult to access the records
- If patient changes its hospital then new hospital will not be able to find patient history
- If patient / doctor get transferred to some other part of country , new doctor will not be able to find previous record of patient

To solve these problems we develop electronic health records.

![Paper Health Records](image)

**III Electronic Health Records (EHR)**

An electronic health record (EHR) which is also known as electronic patient record (EPR) is a concept which can be defined as an organised and systematic collection of patient’s health information electronically.it is a kind of
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database of the patient. It is a record in digital format and is capable of being shared and used across different health care units with the help of network connected information systems. These records include whole range of data including their basic details or demographics of patient, their medical history, medication status, allergies, laboratory test results, radiology images, vital signs or symptoms of the disease. The utility of EHR can be understood as a complete record of patient that allows streamlining of the workflow in health care units and increases the services which can be provided to the patient by the health care unit in order to save his life.

IV Research Methology

In various areas in country we are using paper base health record system. Many of the patients lost there disease history and health reports. For this we develop electronic health records of every citizen of India. For this we will follow following step.

Step 1: Data at the medical colleges
As in Himachal Pradesh there are two medical colleges. State will be divided in two parts. This can be done on the basis of number of villages or number of districts. As in this state there are 12 districts i.e one medical college will make epr for six districts. Every person will be given a particular id number e.g HP 01 000012 (HP for Himachal Pradesh, 01 for medical college 1, 000012 patient number)

Step 2: Data at the state level
After completing the epr at the medical college level. A state level server will be developed on the basis of data available at the medical college level. Where we will be having record of each and every person of the state. Every state will be having its own server at the state level.

Step 3: Data at the country level
After completing the epr at the state level .a country server will be developed on the basis of data available at the state servers. Where we will be having data of every citizen of India. From the country server data will be made available to PHCs, CHCs, Government medical colleges, government hospital, registered doctors and ambulances in India. These data will be available on all type of handheld devices used in mHealth like mobile, smart phones, PDA, iPAD, tablet PCs, Laptop and computersonline using 2G, 3G, Wi-Fi, Wimax etc.
Fig. 4 Access of the electronic health records
Step: 4 Updating of the health records
After taking prescription, the doctor will forward the data to the patient's parent medical college through mail or any electronic means, and the technical person in the medical college will update the data in the health records.

Fig. 5 Updating of data

Reliability
Reliability is the main requirement of the system. There can be a lot of human error in the system. We have to make the data more reliable. If the information available on the system is wrong, then the prescription will be wrong. This can create a problem for the patient. The data will be updated by the technical support officer at the state level only. Proper system tests will be performed for checking the reliability of the system.

Security of data
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Security of data is important. Data is accessible to the registered doctors only. We have to make our data more and more secure. Various layers will be developed and types of information security control are appropriate to databases, including Access control, Auditing, Authentication, Encryption, Integrity controls, Backups, Application security.

Fast access to data

As this is big data base. The system will be very heavy. Data mining should be fast so that patient can be treated well in time. We can use algorithms, optimization technique to make system fast.

V Communication link

2G
2G (or 2-G) is short for second-generation wireless telephone technology. Three primary benefits of 2G networks over their predecessors were that phone conversations were digitally encrypted, 2G systems were significantly more efficient on the spectrum allowing for far greater mobile phone penetration levels, and 2G introduced data services for mobile, starting with SMS text messages. 2G has been superseded by newer technologies such as 2.5G, 2.75G. 2G networks are still used in many parts of the world.

3G
Third generation mobile is also available in various cities of HP. We can use 3G dongle for having internet facilities at village end. 3G or 3rd generation mobile telecommunications is a generation of standards for mobile phones and mobile telecommunication services fulfilling the International Mobile Telecommunications-2000 (IMT-2000). Its services include wide-area wireless voice telephone, mobile Internet access, video calls and mobile TV, all in a mobile environment. To meet the IMT-2000 standards, a system is required to provide peak data rates of at least 200 kbit/s (about 0.2 Mbit/s). However, many services advertised as 3G provide higher speed than the minimum technical requirements for a 3G service. Recent 3G releases, often denoted 3.5G and 3.75G, also provide mobile broadband access of several Mbit/s to smartphones and mobile modems in laptop computers.

Wi-fi
Wi-fi provides wireless internet facilities. It follows IEEE 820.11 standards. It is commonly used in WLAN. Many user can use the Wi-fi connections at a time. Wi-Fi network can be accessed on mobiles, smart phone, PCs, tablet PCs. It has a range of about 20m indoor. It has much range outdoors.

Wimax
WiMAX commonly known as worldwide interoperability for microwave access. It’s kind of wireless communications. It’s a part of fourth generation of wireless communication. It can provide 1 Gbit/s for fixed station. With this technology we can provide data with signal radius of 50 km. WIMAX can provide digital subscriber line (DSL) telecommunications (VoIP) and IPTV services to the users.

VI Discussions

Merits

- This system will help us to provide medical records facility in every village of the state.
- This system will provide job to opportunity to local people
- This system will help in checking the number of patients of particular disease like HIV, cancer, Polio etc.
- This system will help in removing various diseases from the world.
- Patient does not need to keep record of medical treatments given to him.
- A patient can avail medical facilities in any part of India without any paper record.

Demerits

- If data is wrong then prescription will be wrong
- High memory requirement for storing of data
Various algorithms will be required to make the system fast
System will be costly
Server down can create problem to the patients

Future scope

This system can be used to make world free from diseases. This system can be used with ehealth, mhealth and telemedicine models of the country. It can be used to remove epidemics from the society. This concept can be used for developing for improving health sector. This concept can be used for making count of particular diseases e.g. number of diabetic patient in the country, number of heart patient in the country etc. government can make policies for removing diseases from the society e.g. polio, HIV etc. This system can be used in other developing countries.

VII REFERENCES

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