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TELEMEDICINE - A REVOLUTIONARY PARADIGM IN RURAL HEALTH CARE SERVICES

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ABSTRACT**: Telemedicine is an innovative process of synergizing benefits of satellite communication technology in health care services. The information technology with Biomedical Engineering and Medical Sciences is utilized to deliver the health care services to the remote, distant and underserved regions of the country. The main aim of Telemedicine is providing Telemedicine Technology and connectivity between remote/rural hospital and super specialty hospital for tele consultation. This paper proposes the utilization of a mobile telemedicine framework that addresses this dilemma. This paper also focuses on use of web services and mobile application as the client access the application and get consultation based on the patient information, which include expert medical advises .**

Keywords: Tele medicine, pulmonology, registration, optimization, services.

I. INTRODUCTION

Telemedicine is easy to use tool with user friendly and intuitive GUI. It is successful in reaching masses and is set to revolutionize the health care system because it is one of the innovative methods of connecting two distant entities through communication link [2]. It may be noted that generally 90 per cent of the patients do not require surgery and if so the doctor generally need not tap the patient physically, and in that case both need not to be at the same place. The system should be available across the internet, the users like the administrator, medical staff, doctor and the customers can use the system from their respective systems. They can be at different locations and still the patient can be treated. Telemedicine makes an ordinary doctor in rural area do extraordinary work since the specialist in handling the medical problems including emergencies advises the doctor. Customer can register himself or herself to gaining access into this system further, the needy patient need not take on long and difficult journey to towns and cities, especially when the condition of the patient is grim like in case of heart attack or any trauma. There will be cost reduction in terms of reduced necessity to travel for the patient and the family when telemedicine facility is used. The system should be easy to understand and organized in a structured way [5]. Data integrity should be maintained if an error occurs or the entire system comes down. It is essential for medical professionals to keep track and organize their patients' medical records. Keeping this information is not an easy task especially with a huge number of records and other documents that have to be filed, usually in rows of labeled folders in file cupboard. The advances in medical science with the growing influence of technology, mobile phones and computers have made our lives dependent on computer systems. These technology driven devices are making their way towards becoming essential tools in the offices of medical practitioners. With this equipment, record keeping of medical information of patients could be made more competent, convenient and richer in content, including not only pictures but also audio and video records. In this paper the section II narrates about the existing system and proposed system and Section III regarding implementation and discussion on the acquired results . The Section IV discusses conclusion of the experiment and outcome of the telemedicine system evolved.

II . EXISTING SYSTEM

The existing system consists of entering the details in the Microsoft Excel Sheets for the storing of the data. When a Doctor needs information of another doctor, they need to search for the specified file in the file system. They open the file and take the information. Report Generation done manually by copying the

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content of the dissimilar files into another file. The Manually generated report was then printed [1].

A. Limitations in Existing System

Information retrieval is a very big process. Lack of organization of the files may affect to information loss due to accidental deletion of files and demonstrate no security because the files are visible to the users. Report generation will be a big task and a bottleneck.

B. Proposed System

The Proposed system is a browser, which is completely related to online system, which provides the centralized database. It stores the entire information and description of the particular patient's prescription or treatment data. It can also create Excel reports and PDF documents based on the information in its database. The considerations in this section should be taken as suggestions and they should be thought of as recommendations to further enhance the usability of the system.

C. Advantages and Expectations over Existing System

1. The performance is increased due to well-designed database.
2. Increased Security.
3. Timely report generation.
4. Swiftness in updating the details.
5. The system should display a menu for users to choose kind of service or advice.
6. The system should display user-friendly screens to submit or download the files.
7. Services of the system should be available 24 hours a day.
8. The system should be designed in such a way that it is easy to enhance it with more functionality. It should be scalable & easily maintainable.
9. Better component design to get better performance at peak time Flexible service based architecture will be highly desirable for future extension.

III. IMPLEMENTATION AND DISCUSSION

The papers implements five modules namely administrator, medical Staff, doctor, patient and reporting.

***A. Administrator Module*:** The administrator is the Super User module of the System. The administrator is responsible to add, view and delete different medical centers information. Add medical center populates data with Country, State, City/ Town/Village, Contact person and phone no while adding a center. The delete medical center option allows the administrator to select a centre from the list box for deletion. It allows the administrator to add and delete the users. While creating the user he can specify the user ID, password and role (Admin, Medi Team and Doctor) for the users. It allows the administrator to add and delete the doctors' information also. While adding a doctor it asks for doctor's specialization and credentials. It helps the administrator in storing all the report data in excel sheet by clicking on download excel option. It provides a facility for the admin to change his password [3].

B. Medical Staff Module: This user can enter into the application by using his user name and password. This module provides a facility for this user to add, delete and view patient information. While adding a patient it asks for the patient name, age, address, illness, blood pressure, diabetic, height, weight, gender etc. It allows to view the list of medical staff users and store it inside an excel sheet just by a single click. He can place a request to a user regarding a patient which asks the information like patient name, details, doctor, priority and category. He can read diagnosis of a patient request stored by the doctor.

***C. Doctor Module*:** Doctors can provide tips to the patients. Doctors can update the information by adding new information to the existing information. Sometimes they are allowed to delete the tips. Doctors can provide some solutions to the queries sent by the patients as well as provide information to questions asked by the medi-team. Sometimes he needs to do the treatment based on patient condition like high priority or medium priority. Doctors can receive the patient condition like Bp and all based on that he can give the tips.

D. Patient Module: A patient can register himself to enter into this system. Patient can post queries and he can receive tips for his problems. Patient need to enter his details completely to submit his queries. He can view his queries. He can able to modify his profile his own. Patient can be allowed to send the queries from any medical center.

E. Reporting Module:

This module allows the users to view different reports according to their role.

***i. Q and A Report* –** It shows the list of questions and their answers.

ii. ***Tips Report* –** It allows the list of tips to be displayed

***iii. Specializations Report* –** It allows generating the no of doctors in each and every specialization.

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iv. Doctors Reports – It generates the list of doctors.

F. Downloads – It allows to view the list of files which we can download .We can store all the reports in a excel sheet very easily just by double clicking on download to excel option.

Tables I: Use of cpt code+76937

Year of table	Internal Medicine	Pulmo-nology	Critical Care	Total
2007	4,354	1,965	327	6,645
2008	4,789	4,049	2,441	11,278
2009	5,545	5,,555	3,552	13,456

Here we are discussing about use of cpt code+76937. Here we have year of the table, internal medicine, pulmonology , critical care and total. year says about in which year we are discussing about the internal medicine, pulmonology, critical care and the total. Internal medicine means the branch of medicine that deals with the diagnosis and (nonsurgical) treatment of diseases of the internal organs . pulmonology defines A subspecialty of internal medicine concerned with the study of the respiratory system. It is especially concerned with diagnosis and treatment of diseases and defects of the lungs and bronchial tree. Critical care services are defined as a physician's direct delivery of medical care for a critically ill or critically injured patient. The duration of critical care services for both CPT and Medicare is based on the physician's documentation of total time spent evaluating, managing, and providing care to the critical patient, as well as time spent in documenting su**ch** activities. During this time the physician must devote full attention to the particular patient [4]. This time may be spent at the patient's immediate bedside or elsewhere on the unit, so long as the physician is immediately available to the patient. Total says about number of internal medicine, pulmonology and critical cares are present in that particular year.

Study of ICU and hospital length of stay in telemedicine: here we are discuss about the parameters governing the telemedicine i.e. mean, standard deviation (SD)total and also the control mean , standard deviation (SD) ,total. Finally we are calculating the difference between the mean of telemedicine and control as mentioned in the given table II and Table III.

Table II . Study of icu length of stay

	Telemedicine			**Control**				
	MEAN	SD	TOTAL	MEAN	SD	TOTAL	WEIGHT	MEAN Difference
Rosenfeld in,2000	2.0	2.35	201	2.88	5.43	427	15.9%	-0.88
Breslow in 2004	3.63	5.76	744	4.35	8.1	1396	16.1%	-0.72
Kohl in 2007	3.78	26.02	2622	8	8.3	578	12.7%	-0.50
Vespa in 2007	7.5	8.8	640	2.60	3.16	1371	18.7%	0.46
Morrisom in 2010	3.06	4.24	2717.	2.60	3.16	1371	18.71%	0.46
Lilly in 2011	4.5	6.7	4761	6.4	11	1529	16.1%	-1.90
Willmitch in 2012	4.09	5.171	16152	4..2	6.345	6504	18.9%	-0.62
			29637			11994	100%	-0.62

Overall effect p=0.04; heterogenalty $I^{2=}$92%

Table III. Hospital length of stay

	Telemedicine			**Control**				
	MEAN	SD	TOTAL	MEAN	SD	TOTAL	WEIGHT	MEAN Difference
Rosenfeld in,2000	9.28	10.99	201	9.62	8.26	427	15.5%	-0.34
Breslow in 2004	11.14	16.76	744	12.77	12.34	1396	17.3%	-1.63
Kohl in 2007	16.57	57.36	2622	21	31.65	189	4.7%	-4.43
Morrisom in 2010	7.93	8.29	2717.	7.72	7.96	1371	21.2%	0.21
Lilly in 2011	9.8	10	4761	13.3	17.1	1529	19.7%	-3.50
Willmitch in 2012	11.06	13.627	18152	11.38	15.356	6504	21.5%	-0.32
			29637			11416	100%	-1.26

Overall effect p=0.04%; heterogenality=91%

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Figure 1: View doctors Details

It involves decision making of high complexity to assess, manipulate, and support vital organ system failure and/or to prevent further life threatening deterioration of the patient condition. here we have discussed about the parameters governing the telemedicine i.e. mean, standard deviation (SD)total and also the control mean , standard deviation (SD) ,total. Finally we are calculating the difference specification and qualification and the status wheather it is available are not. Figure 2. highlight registration process which can be populated with user/doctor identification, password and the authentication details. In the administration home page doctor can also register by specifying their doctor name, qualification, specification, hospital name and the doctor status i.e. he/she working an eye specialists or ayurveda etc. Figure 3. show case queries and the answers with aid of question id's and their respective answers which would be helpful in ascertaining the doctor id's and mapping to their availability/appointment status.

between the mean of telemedicine and control in the given table. Figure1 illustrates suitable and avialable doctors on the administrtion to elicit

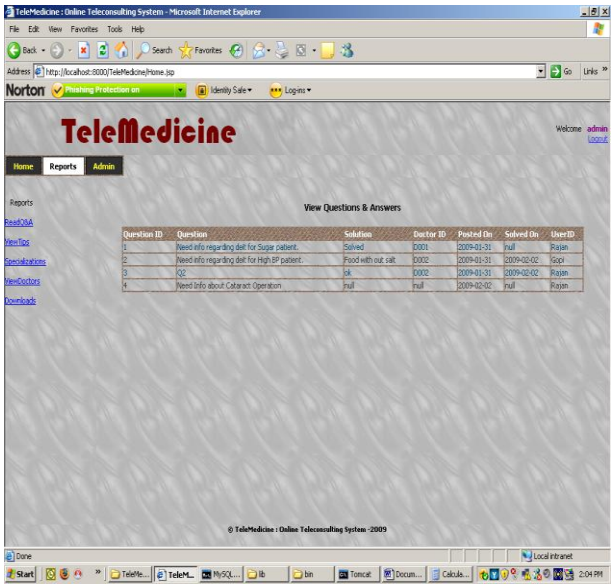

Figure2: View question and answers

Figure 3: Add Doctor or User to the database

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IV. CONCLUSION

The Telemedicine is a web-based application for tracking the service-oriented activities for a medical department or a foundation which provide customized solutions to meet enormous patient needs. This application software has been computed successfully and was also tested successfully by taking "test cases". It is user friendly, and has required options, which can be utilized by the user to perform the desired operations. It facilitates Optimum utilization of resources, Efficient management of records along with faster associability and with reasonable cost benefit. Thus would cater to all medical needs and it might bring about paradigm shift in medical services online.

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