# TeleMed Doc

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**Abstract -** Telemedicine is taken into account to be the remote diagnoses and treatment of patients by the means of telecomunications and mobile technology, thereby providing a substantial aid to low financial gain regions. Earliest printed record of telemedicine was within the half of the 20th century, when cardiogram was transmitted over phone lines. From then to nowadays, telemedicine has made an extended means in terms of each health care delivery and technology. Thoughtful role during this was contend by the world National Aeronautics and the Space Administration (NASA) and ISRO with terms and conditions. The mounting of the National Telemedicine Taskforce by the Health Ministry of Asian country, in 2005, created means for the success of assorted projects just like the ICMR-AROGYASREE and VRCs. Telemedicine additionally helps family physicians by giving them quick access to serving to them in direct observation of patients. Differing kinds of telemedicine services like store and forward, time period and remote or self-monitoring provides numerous academic, health care delivery and management, malady screening and disaster management services everywhere in the world. Although telemedicine can't be an answer to any or all the issues, it will sure facilitate decrease the burden of the aid system to an oversized extent.

**General Terms:** Telemedicine can be broadly outlined as the use of smartphone technologies to provide medical information and services. Though this includes medical services that uses the smartphone. The fact thing is telemedicine is very cast-off as stenography for remote electronic experimental conference.

***Key Words*:** The applications of telemedicine, history of telemedicine, telemedicine in family suppository, telemedicine in Asia, telemedicine in public well-being types of telemedicine, online discussion, Information technology management in health care, Technology Acceptance Model, telemedicine, well-being telemedicine, information telemedicine.

## 1. INTRODUCTION

Information accomplished by American Telemedicine Association (ATA)," Telemedicine is the natural development of healthcare within the digital world". After few respondents realized the World Health Organization (WHO) has declared telemedicine as, "the delivery of health care services, somewhere distance may not or may be a very important issue, by all healthcare professionals using information and communication technologies for the conversation of valid information for analysis, treatment and cure of illness and injuries, research and evaluation, healthcare and for the continued education of aid providers, all in the interests of advancing the health of people and their communities."[1] The word "telemedicine" literally interprets to 'healing at a distance'. Telemedicine has created the life easier for the health care professionals. It is typically used as the umbrella term to surround health care delivery in addition to alternative activities such as education, research, health surveillance and public health promotion.

## 2. BODY OF PAPER

### 2.1 LITERATURE SURVEY

A literature survey or a literature review in a project report is that section that shows the various analyses and research made in the field of your interest and the results already published, taking under consideration the varied parameters of the project and therefore the extent of the project.

It is the leading important part of your report because it gives you a direction within the area of your research. It helps to line a goal for your analysis.

| SR No | Paper Name | Author Name | Country | Research and Development Methods | Contribution |
|---|---|---|---|---|---|
| 1. | Telemedicine Security:A Systematic Review (2011) [21] | Vaibhav Garg, Jeffrey Brewer | US | All 14 journals were searched through PubMed. In all, 66 articles were found. | This paper indicates insufficient reporting of methodology in telemedicine investigation. |
| 2. | Table Analysis and Information Extraction for Medical Laboratory Reports (2018) [22] | Wenyuan Xue, Qingyong Li, Zhen Zhang, Yulei Zhao, Hao Wang | EUR | System on a new dataset of medical laboratory reports that includes scanned images and camera-captured images. | This paper indicates extracting of data from captured image by segmenting it from table area and texts following the top-down pipeline. Evaluation is done on the basis of new dataset. |
| 3. | Biometric -based efficient medical image water-marking in E-healthcare application (2019) [23] | Puvvadi Aparna, Polurie Venkata Vijay Kishore | IND | Cryptography algorithm was proposed authentication, confidentiality, and reliability of the system. | This paper demonstrates the competent medical image watermarking using biometric which produces a system for authentication, confidentiality and reversible watermarking for truthfulness. |
| 4. | Analysis of Research in Healthcare Data Analytics (2016) [24] | Mohammad Alkhatib, Amir Talaei-Khoei, Amir Ghapanchi | US | Medical operations, reports, decision making, and prediction and prevention system. | This paper proposes data analytics tools and techniques that will help doctors and nurses to determine the diseases as well as provide needed treatment at the right time. |
| 5. | Method of locking an application on a computing device (2016) [25] | Gary James EGGERTON, Andrew John Farnsworth | US | Signifying on receiving user input, computing device lock, switching another application. | This paper present technology relates generally to computing devices and, in particular, to access control for computing devices. |
| 6. | Scanning and capturing digital images using layer detection (2009) [26] | Lydia M. Do, Pamela A. Nesbitt, Lisa S. Deluca | US | illustrative embodiments relate generally to a document scanning, capturing digital, images file layer discovery | This paper illustrate pictures then scan the one or more layers within the document on a layer-by-layer specifically on basis. |
| 7. | Telemedicine systems and methods (2015) [27] | John Allen Pacey, Reza Ahmadian Yazdi, Shahrad Payandeh, Siamik Hafizi Moori | US | The present disclosure relates to methods, techniques, initiative systems for telemedicine and, in specific to methods, procedures, and systems for using telemedicine of remote care. | Medical device operating instructions and other information are received from the remote care site. The medical device operation instructions provide guidance for operating the attached medical device. |

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|---|---|---|---|---|---|
| 8. | Exploring Security Issues in Telehealth Systems Telehealth (2019) [28] | Carla Taramasco, Hernán Astudillo, Gastón Márquez | CA | Areas such as requirements, software architecture, and security patterns play an important role in order to handle security matters. | This paper identified 41 studies which were classified according to their research strategy, target problem, security topic addressed, and proposals. security issues were identified, strategies were distinguished. To handle security issues, patient and wireless medical data are the most affected medical goods. |

**Comparative table from literature survey**

| **Sr No.** | **Assessment** | **Medici** [29] | **MFine** [30] | **Babylon** [31] | **Doctor on Demand** [32] | **Tele Health** [33] | **TELE MED DOC** |
|---|---|---|---|---|---|---|---|
| **1.** | **Upload Doc. / Pictures** | YES | YES | YES | YES | YES | YES |
| **2.** | **Scanning Documents** | NO | NO | NO | NO | NO | YES |
| **3.** | **Sharing Documents** | YES | YES | NO | YES | YES | YES |
| **4.** | **Analysis Reports** | NO | NO | YES | NO | NO | YES |
| **5.** | **Security Lock** | NO | NO | NO | NO | NO | YES |
| **6.** | **Daily Prescription** | YES | YES | NO | YES | YES | YES |
| **7.** | **Family/ User History** | NO | NO | NO | NO | NO | YES |
| **8.** | **User Symptom / Troubles** | YES | YES | YES | YES | YES | YES |
| **9.** | **Consultant Doctor** | YES | YES | YES | YES | YES | YES |
| **10.** | **Emergency Contact** | NO | NO | NO | NO | NO | YES |
| **11.** | **Verification Code** | NO | NO | NO | YES | YES | YES |
| **12.** | **Daily Reports** | YES | YES | NO | YES | NO | YES |

## 2.2 MODERN TELEMEDICINE

Over the past many decades, since the use of wireless broadband technology has become a lot advanced and mobile phone and internet use has become nearly ubiquitous. Patient reports with pictures and videos, transfer of medical images like X-rays and scans, and real-time audio and video consultations became a reality.[2] Health care expansion is a set of organization like bandwidth communication speeds and dependency, individual telemedical information, information storage databases, internet service backups, standard formats for data transmission, encryption, password protection, one from HIPAA (Health Insurance Portability and Accountability Act) pointers, decryption, analysis digitalizing info and foundation of EMRs (electronic medical records) created e-health and telemedicine stress-free and cost effective.[2]

The contemporary telemedicine uses existing computing devices owned by the patient or physician and low-priced, self-owned equipment like smartphone cameras, habiliment biosensors and many others for gathering clinical information

that created it easier to use without special informal. [2] The recent telemedicine practices lessen travel expenses, saves time, reduces medical prices and provides easier access for the individual to specialist doctors while not disrupting their daily responsibilities. It additionally created the life of healthcare providers simple by decreasing the load of incomprehensible appointments and cancellations, increasing revenue and patient load and rising follow up and health outcomes. [4]

Stepping into the 21st century, numerous national/international organizations just like the ATA, Washington DC, are set up – which are entirely dedicated to providing of telemedicine services.

### 2.3 TELEMEDICINE IN INDIA

India is a giant and extremely inhabited nation with quite 121 crores of varied folks. Because of this fact, the even-handed distribution of health care services has well-tried to be a serious goal for public health management time and again. Moreover, adding to the present trend of attentiveness of health care facilities to the cities and towns are including 75% of the population of surgeons, far away from rural India, where 68.84% of the national population live.[5]

Firstly, Indian Space Research Organization created a modest starting in telemedicine in India with a Telemedicine Pilot Program in 2001, linking Chennai's Apollo Hospital with the Rural Hospital at Aragonda village with in the Chittoor region of Andhra Pradesh. Secondly, creativities are taken by ISRO and Department of data Technology (DIT), Ministry of External Affairs, Ministry of Health and Family Welfare, and also the state governments played a big role within the event of telemedicine services in Republic of India.

In an effort to unite the obtainable public health information and provide easy accessibility to the Ministry of Health within the Government of India has taken up projects similar as Integrated Disease Surveillance Project (IDSP), 2nd National Cancer Network (ONCONET), 3rd National Rural Telemedicine Network, 4th National Medical College Network, and also the 5th Digital Medical Library Network.[6] fixing of standardized telemedicine practice guidelines by the Department of data Technology within the Government of India, and fixing of a National Telemedicine Task Force by the Health m, Ministry, in 2005, were few of the opposite positive steps taken by the govt. Informal way international projects are a bit like the Pan-African Network Project and consequently the SAARC (South Asian Association for Regional Co-operation) and telemedicine Network Projects have also been haunted as an initiative of the External Affairs Ministry purposes, strategically placing Indian telemedicine within the planet[6].

Telemedicine services in India includes mammography services at Sri Ganga Ram Hospital, Delhi, oncology at Regional cancer centre, Trivandrum surgical services at Sanjay Gandhi Graduate Institute of Medical Sciences, School of Telemedicine and Biomedical Information's, and many extra with gratified.[1] Telemedicine additionally finds its use in places wherever huge populations occasionally/periodically gather at a period of time, where provision of medical aid becomes the requirement of the hour, the Government of Uttar Pradesh practices telemedicine during Maha Kumbhamela.

Telemedicine is one field that has been successful, in invoking a keen interest within the private sector and creating them to take a full-time part in public health management. Previously the present major Indian private sector players in telemedicine incorporate Narayana Hrudayalaya, Apollo Telemedicine Enterprises and Asia Heart Foundation, Escorts Heart Institute, Amrita Institute of Medical Sciences and Aravind eye care treatment. [7] They perform with support from the central and state governments and from organizations like ISRO who guide them with proper and updated technology. [8]

In the past few years, ISRO's telemedicine network has returned a protracted method. It has dilated to attach 45 remote and rural hospitals and 15 super specialty hospitals. The remote nodes incorporate the islands of Andaman and Nicobar and Lakshadweep, the craggy regions of Jammu and Kashmir, Medical College hospitals in Orissa and few of the rural/district hospitals in other states. [8]

### 2.4 CURRENT STATE IN INDIA

WHO recommends a doctor-population in proportion of 1:1000 whereas this doctor population ratio in India is barely 0.62:1000.[9] Coaching of recent physicians is time intense and costly, thus the doctor to patient proportion is expected to stay low for an extended time to arrives This deficit is partially being created up by the active telemedicine services in varied areas of the country.

Telemedicine services within the country come below the combined control of the Ministry of Health and Family Welfare and the Department of data Technology. Telemedicine division of MoHFW and GOI has created up a National Telemedicine Portal user to employing a green field project on e-health establishing a National Medical College Network (NMCN) of e-Education and a National Rural Telemedicine Network for e-Healthcare conveyance system developed.[10]

during constituent of the e-health wing of the National Health Portal (NHP), the National Digital Health Authority of India (NDHAI)/National e-health authority (NeHA) is being created

up with a vision of achieving high-quality health services for secure use of ICTs in health and health-related arenas.[11] to verify safe information transmission throughout the telemedicine practices, MoHFW has developed a set of Electronic Health Records (EHR) standards in 2013 and a Revised Version of an equivalent in 2016.[12] Telemedicine practices in India also are extended to the fields of ancient medication. The National Rural AYUSH Telemedicine Network aims to push the great things about ancient ways of healing to a much bigger population through telemedicine.[13]

Village Resource Centre (VRC): The VRC idea has been developed by ISRO to produce a range of services like: tele-education, telemedicine, online-decision support, interactive farmers' informative services, tele-fishery, e-governance services, weather services and water management. The VRCs not solely act as learning centres and however additionally offer connectivity to specialty hospitals, thus bringing the services of specialised doctors to the villages. As per the affirmation approximately 500 such VRCs have been recognized within the republic.[14]

Furthermore, the Arogyasree [15] is another internet-based mobile telemedicine conglomerate that integrates multiple hospitals, mobile medical specialists, and rural mobile units/clinics. As per the Indian Council of Medical Research (ICMR) and they need to collaborate with a team of scientists from the University of Karlsruhe, Germany who are engaged in the design of an ECG jacket that may be used for the continual monitoring of a patient's ECG while not the hospitalization.

## 2.5 TYPES AND APPLICATIONS OF TELEMEDICINE

Telemedicine can be classified into five basic types: [1]

According to the period of the data transmitted:

(i)Real time or synchronous telemedicine (where each the sender and receiver are online at equivalent purpose of time and 'live' transfer of data occurs).

(ii)Store-and-forward or asynchronous telemedicine (where the sender stores the data databases and sends it to the receiver at a convenient purpose of your time, and therefore the receiver will review the information in keeping with his convenience).

(iii)Remote observance kind of telemedicine, co-jointly called as self-monitoring or self-testing. Remote observance uses a spread of technological devices to watch health and clinical signs of a patient remotely.

According to the interaction between the people involved:

(iv)Health care provider to health care provider (giving easier access to specialty care, referral and consultation services).

(v)Health care provider to patient (providing health care to the inaccessible population by giving them direct access to a medical professional).

**Applications**

I. **EDUCATIONAL** [7]

**Tele-education:** A long-distance learning programme as long as easier coaching and updates of the new advance's technology for a lot of precise and effective treatment strategies and techniques for the patient.

**Tele-Conferencing:** The cases conversation and interaction between doctors throughout conferences call, seminar or continual medical education arrangements during a virtual surrounding and contact.

**Tele-Proctoring:** As mentoring and analysis of medical trainers from distance with the participation of knowledgeable video-conferencing equipment to understand telehealth training.

I. **HEALTHCARE DELIVERY** [16]

- **School-Based Health Centres:** Helps manage sick conditions like asthma, diabetes and fatness. Telemedicine permits a school nurse to relinquish remote access to the doctor.
- **Correctional Facilities:** Cater to the healthcare needs of the inmates while not the expense and dangers of inmate transportation or the necessity for a specialist doctor to enter.
- **Mobile Health Clinics:** It provides fast access to a distant doctor.
- **Shipping and Transportation:** Helps avoid evacuations and impromptu diversions throughout a medical emergency.
- **Industrial Health:** Provides medical management and prioritize advice on-site.

III. **HEALTH PRESERVATION MANAGEMENT** [1,7]

- **Telehealth care:** The use of ICTs for defensive and inspirational healthcare, the more divided into teleconsultation and Tele-follow up.
- **Tele-home health care:** Monitor patients from a central station (Remote patient observation) with the

help of a Computer Telephone Integrated system for round-the-clock vitals intensive care.

- Specialties like teleophthalmology, telepsychiatry, telecardiology, and telesurgery.
- Diagnostic services like teleradiology and Tele-endoscopy.

**IV. BROADCAST OF DISEASES** [17,18] Examples:

**Diabetic showing mission by MDRF:** The Chunampet Rural Diabetes Prevention Project. Ophthalmology screening by Aravind Hospitals at Andipatti township community.

**V. DISASTER MANAGEMENT** [7]

A mobile and movable telemedicine system with satellite connection and customised telemedicine software is ideal for a disaster-stricken region wherever all alternative modes of connectivity are discontinuous.

Examples:

- Presenting the NASA tele-medicine facilities provided during 1985 Mexico City earthquake and 1988 Soviet Armenia earthquake.[3]
- Amrita hospital tele-medicine services provided throughout 2004 Tsunami tragedy occurrence.[19]

### 2.6 ROLE IN FAMILY MEDICINE

With the arrival of recent info and communication technologies (ICTs), telemedicine is currently migrating health supply from hospitals and clinics into homes, each nation-wide and globally. It facilitates remote patient observation with the assistance of a CTI system enabled for twenty-four hour vitals observation. [7] CTI system permits the family physicians to inveterately monitor sick patients and receive live vitals alerts when needed. When required, telemedicine even permits a family physician, remote access to specialist medical opinion for cross consultation. [16] A decent example would be consulting a cardiologist so as to confirm a uncertain ECG or consulting a nutrition list to formulate a perfect diet set up for an elderly bed-ridden patient with multiple co-morbidities.

Telehealth differs from telemedicine in this it involves the employment of telecommunications and virtual technology to deliver health care outside of ancient health-care facilities. An example would be, virtual home health care, wherever patients who are inveterately sick or the old may receive guidance in certain procedures while remaining at home. [20] Tele-health services are of 4 types specifically and video conferencing storing file and forward m-health and patient specialist care. Despite getting such tons of promising traits for assisting family physicians, telemedicine is however to realize its full potential in family practice. Situation like lack of pertinent scientific literature viewing the applications and cost of its utilization in family medicine is proving to be the most preventive. [20]

### 2.7 ROLE IN PUBLIC HEALTH

The technology intricated in telemedicine permits medical professionals and patients to be nearly anyplace, this can be one of the key factors in providing quality aid to the needful. With the increase of telemedicine, distance isn't anymore a hurdle in providing aid to the remote areas. [7,16] The initial challenge for the commencement of the program initially was the shortage of a primary center for active telemedicine services in several remote areas was resolved with the kickoff of mobile telemedicine units with satellite communication.[16] Now, telemedicine services are going to be created accessible to all or any despite place, social station, or gender. Gujarat Govt.'s e-health theme, Aravind eye hospital's teleophthalmology unit at Andipatti, [18] the conception of village resource center (VRC) by ISRO [14] are all instances of India's steps towards pioneering in telemedicine services.

## 3. CONCLUSION

There are other ways to create, capture and monitor value besides the approaches discussed in this paper. Telemedicine is the essence in addressing a massive range of healthcare issues. International telemedicine initiatives are bringing the planet nearer and distance is no longer a barrier for quality healthcare. The medical records are necessary to send while international healthcare is being taken. The medical documents are more secured on a cloud storage. Till date there is no system, which has all the above functionalities like secured data storage, sharing of the data, analysis of medical reports. If an application which supports all of it with that also supports multiple profile for the family members than it would be so convenient for the user. In any emergency situation, the medical details of the user can be accessed. Due to lack of awareness and acceptance of recent technology both by general public and medical professional digitalization in the field of healthcare is at low rate. By digitalization of medical records, the medical data can be analysed by the system to state the condition of patient based on the algorithm.

Governments are currently taking keen seeking in developing telemedicine. Government is planning to have a health-care through which all the details of the person is available at one place.

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