Application Development in Connectivity Ecosystem of Remote Healthcare: A Survey

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Abstract - *In simple terms, Connectivity ecosystem in Remote Healthcare refers to How the embedded devices, patient EHR and Room care platform, etc. are connected while monitoring healthcare remotely. It aims to ease the treatment for patient. Therefore, there is a need of using an application for accessing and operating patient health remotely by a medical personal. This paper proposes a solution for remote Healthcare management by implementing application software that will act as a middle platform in Healthcare connectivity system also providing security to important data exchange between medical devices. It will be used to monitor various aspects of patient health, controlling the surrounding physical objects like beds, performing Health related tests to detect any risky situations. This paper aims to propose a technology which will enable engineering aspects in medical sector also increasing the percentage of safe care than traditional systems.*

*Key Words***: Remote Healthcare management, EHR (electronic health record), connectivity ecosystem, application development, IOT**

1.INTRODUCTION

At the present time, healthcare monitoring systems development is occupying special attention by researchers and medical authorities. Several research efforts have been carried out in this direction and many others are in progress. With the number of elderly people and patients with chronic diseases increasing rapidly, deficiencies in the healthcare service are increasing significantly.

To serve the purpose for remote healthcare various ecosystems can be used. Technology such as using IOT to exchange data between various embedded devices that are in hospital room, using android application to control and supervise all things also using EHR to analyze the risk and status has made everything comfortable and fast especially for elders and child.

1.1 Importance of Remote Healthcare

Nowadays, in every sector technology revolution has happened, so how can be the medical sector lag? We know that already we are facing lack of medical facilities, professionals to fulfill the increasing population need, so there is a strong need of enabling automation to save time and efforts.

There are some human limitations for continuous care and that's where automation comes. linking IoT with smart technologies can provide multiple and improved services. Continuous remote care is now possible with intelligent and remote-controlled wireless communication technologies to build various emergency systems with the help of sensors.

1.2 Classification of Remote Healthcare

Various ecosystems can be implemented according to situation at different levels. Remote management of health can have different types.

1.2.1 Room care Monitoring in hospitals

In this scenario, medical personals can monitor the patients live from outside the ICU rooms, such high-risk patient needed continuous 24-hour health status within hospitals. One can establish various technology infrastructure to serve the purpose. Embedded devices integrated with mechanical objects, software applications playing vital role here.

1.2.2 Hospital to Home Monitoring

In this case, after getting discharge from hospital there is a need of tracking the post-health status periodically. so, using EHR to analyze and categorize the health status is necessary. Generating EHR can be made possible through inner body smart implants like pacemaker, etc.

1.2.3 Home monitoring

In this scenario, the common health related wearable devices are very important which depicts the pulse rate, oxygen level. Also having access to application for any emergency situations which will bring medical services at home.

2. LITERATURE SURVEY

In this part, summarization of the already present research work is done. A new Remote healthcare system will be created based on the existing work with additional functionality.

Shaira Tabassum.[1] In this paper, the author has proposed a remote healthcare system consist of a triage function that partitioned the patients in two major groups- (1) healthy and (2) unhealthy. They aim to predict the status of the registered patients to decide the follow-up date and frequency. they

used three encoding techniques and implemented a new encoding way to handle categorical variables. The outcome shows that Random Forest Classifier works best with 96.33% accuracy.

Manoj Kumar.[2]   In this author used JWTs (JSON Web Token) for authentication of subsequent client requests without making frequent calls to the resource server or database. In this paper, they present an authentication technique for regeneration of JW token on every client request based on truly random timestamp values to optimize the authenticity of client on server specially in IOT and cloud-based applications.

Durga Amarnath M. Budida.[3]   The author in this paper has proposed system aims to cover an end-to-end smart, efficient and innovative health application that can be built up with two functional building blocks. However, the main function of the first building block is to gather all sensory data that are related to the monitoring of the patients, whereas the second block function is to store, process and present the resulted information on the server where the doctors can access health reports following the case of the monitored patients.

Dr. Sandeep Chatterjee.[4]   The author of this research paper has introduced the combination of lightweight and large-scale interoperability of Web services together with the 24x7 access of mobile devices represent a strong platform for the development and delivery of ubiquitous and low-cost healthcare applications and systems.

Madhuresh Mishra.[5]   The author of this research paper has explored the idea of RESTful Service Mashup by integrating individual Web Services which can satisfy end users' requirements over SOAP. For this work, they propose a recursive algorithm. The work is on Android, API level 8 and above. It is supported on lots of Android based mobile devices.

Matthias Gorges.[8]   This Author has proposed implementation that allows any medical device to become interoperable without knowledge of the existence of other devices, and provides a simple, scalable solution to the current lack of medical device connectivity. They have implemented a Vital Bridge interface running on WIFI enabled Beagle bone Black embedded devices. This enables existing devices to connect to new communication architecture and used it to implement an integrated mobile supervising and team communication platform for the ICU.

Bingchuan Yuan.[9] In this paper, the author has implemented CARA (Context-Aware Real-time Assistant) healthcare architecture to enable improved healthcare through the intelligent use of wireless remote monitoring of patient vital signs, supplemented by rich contextual information. The signs are supervised using wireless BAN based on sensors that can monitor position in space, blood pressure, ECG, and blood oxygenation.

3. PROPOSED SYSTEM

3.1 Problem Statement

Android Application Development to Improve the Connectivity of Remote Healthcare Management System.

3.2 Problem Elaboration

Displaying Caregivers Room in application for Monitoring Hospital s Bed Compliance, Remote Setting of a Bed through application using underlying technology as internet of things, enabling Secure Communication between Server and Application also Retrieving electronic health record of Patients for Hospitals to analyze and make decisions.

3.3 Proposed Methodology

Proposed system consists of Connectivity Ecosystem which connects the Embedded beds with mobile application and Room care platform which will be used by medical personals. For this Gateway and Server will be used. In this case, Server takes the data of Smart bed and send it to Third party applications, where application will help the nurses to take care of patient remotely also the Nurses get allotted their patient rooms.

Furthermore, Smart bed generates the data which is send to application through Iot infrastructure. Application will consist of various smart functionalities like alerts and Reminders, remotely operating bed, various Risk Assessment and many more.

4. CONCLUSION

In this paper, we have introduced a new remote healthcare management system which will monitor and take care not only the internal body parameters but also the outside body parameters. Such mechanism will bring the ease in taking care of patient continuously by eliminating the human limitations.

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BIOGRAPHIES

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