IoT Virtual Doctor Robot

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Abstract: Our project deals with the modalities of the Smart Virtual Doctor Robot using Internet of Things (IoT), a user-friendly health Robotic machine with an interactive user interface for medical necessities. The check-up/self-screening test is a virtual health system, aimed at the first point of contact for monitoring heart rate, blood pressure, temperature. In case of emergency, a doctor will be available online through a video call, based on the severity of patient's conditions, a call can be placed by a doctor to book an ambulance (based on the conditions). In non-emergency cases, the system will also dispense medicines prescription based on the health conditions. As an overall Result, the Doctors feel the system can be adopted in an area where medical facility is not available immediately. In such regions adopting this system not only help in medical emergencies/epidemic/pandemic such as COVID, it also increases the percentage of survival. Our overall system is controlled and monitored using Microcontroller and IOT.

Keywords: Virtual Doctor Robot, dispense medicines prescription, percentage of survival.

I. INTRODUCTION

There is a growing trend in the medical field to minimize the need for hospitalization, moving several health care procedures from hospitals (hospital centric) to patient's homes (home-centric). This strategy has been raised mainly due to its possibility for improving patient's wellness and treatment effectiveness. It can also reduce the costs of the public health system worldwide and its efficiency, which in the last decade has been challenged by the population aging and the rise of chronic diseases. Furthermore, the current COVID-19 outbreak has exposed the importance of rapidly scaling the health system and keeping at home patients who are high-risk but not severe enough to stay hospitalized.

For this purpose, Internet of Things (IoT) provides the scalability which supports continuous and reliable health monitoring on a global scale. This paradigm is increasingly becoming a vital technology in healthcare. Furthermore, the recent progress in low-power consumption, miniaturization, and biosensors has revolutionized the process of monitoring and diagnosing health conditions.

For patients' de-hospitalization the platform proposed initially were designed, by including wearable and unobtrusive sensors. The software is developed and the components are guided by the Reference Architecture for IoT-based Healthcare Applications for a real intensive care unit (ICU) and the interoperability with existing multiparametric monitors for COVID-19. By describing the engineering process and the application deployment steps performed in this experience, we provided relevant guidelines to practisioner. The researchers concerned with IoT-Healthcare Applications. Finally, to the best of our knowledge, in a real ICU we could not find any other work that reports similar experiences on the extension, development, and deployment of IoT applications. I IoT-based healthcare applications the goal was to comprehend to the current state and future trends. Thus, the research questions that addressed the review were related to the main characteristics (requirements), protocols, challenges, and opportunities related to these applications.

II. LITERATURE SURVEY

Divya Ganesh., [1] The aim of the paper is to develop an automated system that can connect to doctors, hospitals or healthcare professionals in a quick time, which will control the spread of diseases and reduce the growing rates of mortality in rural areas.

Itamir De Morais Barroca Filho., [2] IoT emerges as an encouraging paradigm because it provides the scalability required for this purpose, supporting continuous and reliable health monitoring on a global scale. Based on this context, an IoT-based healthcare platform to provide remote monitoring for patients in a critical situation was proposed in the authors previous works.

Seyed Shahim Vedaei., [3] In a smart healthcare setting, the IoT can help to provide a remote diagnosis prior to hospitals for more efficient treatment. For diabetic patients, it is vital to monitor their blood glucose continuously; blood glucose data can be sent from wearable sensors to doctors or smartphones for continuous monitoring of patients' state of health develop an IoT e-health system based on Wireless Sensor Networks (WSN).

Kashif Hameed., [4] Telemedicine is simply defined as "the remote delivery of healthcare services." Although telemedicine brings with it many benefits, it has some downsides as well. Providers, payers, and policymakers alike know that there are some gray areas that are difficult to keep up with. While the field will grow exponentially over the next decade, it will bring with it both practical and technological challenges.

Mohd. Hamim, Sumit Paul., [5] . IoT integrated with the health wearables can overcome the need of visiting hospitals for primary health issues. This also reduces the medical expenses for patients significantly. In addition, the doctors can prescribe necessary medications by observing the patient's health stats over time through an application. Detailed analysis of the signals was obtained with respect to variations in physical and environmental activities to understand the functioning of the sensors used.

Prajoona Valsalan., [6] In this paper, a portable physiological checking framework is displayed, which can constantly screen the patient's heartbeat, temperature and other basic parameters of the room. We proposed a nonstop checking and control instrument to screen the patient condition and store the patient information's in server utilizing Wi-Fi Module based remote correspondence.

Md Anowar Hossain., [7] The majority of medical personal wanted to control their assistant robot over the internet. Another paper named as FASTele – A Tele-Echography portable robot system can be used by any paramedic for an emergency purpose. There have been some methods on the PMS (Patient Monitoring System), advanced healthcare, smart healthcare, digital thermometer, Non-contact Infrared Thermometer.

B.Sundari., [8] The integration of multisensory inputs promotes the involvement of associative cortices that play a key role in learning and consequently in neuronal plasticity and recovery. While only a few studies compared neurocognitive therapy to other rehabilitative approaches, some promising work suggested that it can significantly improve upper-limb function, ability to perform activities of daily living and quality of life compared to conventional task-oriented training.

Kaviya kumar., [9] An intelligent network infrastructure that is dynamically enhanced and extended by edge nodes, which are generated by interconnected robotic things, could serve as the backbone for IoRT applications. The IoRT combines autonomous robotic systems with the IoT/IIoT, intelligent connectivity, distributed and federated edge/cloud computing, Artificial Intelligence (AI), Digital Twins (DT), Distributed Ledger Technologies (DLTs), Virtual/Augmented Reality (VR/AR), and swarm technologies.

Ankit Patel., [10] With the advent of Internet of Things (IoT), robots are integrated as a 'thing' and establish connections with other things over the Internet. It clearly indicates the long term benefits of human being in healthcare sector, medical emergencies, e-health, etc. using robotics and IoT. Also, the phase of adoption, interaction, challenges for future is to be discussed. As IoT having features of reconnect with different entities like apps, devices and people interaction, which gives the better solution for healthcare and medical industry.

Table 1: Summary of Literature survey

S.NO	TITLE	TECHNIQUE
1	AutoImpilo: Smart Automated Health Machine using IoT to Improve Telemedicine and Telehealth	Automated Health Machine and IOT
2	An IoT-Based Healthcare Platform for Patients in ICU Beds During the COVID-19 Outbreak	Data Acquisition
3	COVID-SAFE: An IoT-Based System for Automated Health Monitoring and Surveillance in Post-Pandemic Life	Application program interface

4	An Intelligent IoT Based Healthcare System Using Fuzzy Neural Networks	Smart healthcare monitoring, patient management system
5	IoT Based Remote Health Monitoring System for Patients and Elderly People	Cloud storage with Raspberry Pi interface
6	IOT Based Health Monitoring System	IOT cloud
7	IoT Based Medical Assistant Robot (Docto-Bot)	IOT and Sensors
8	Design and Implementation of Robot Assisted Surgery Based on Internet of Things	Web server with Robotic arm
9	Internet of Robotic Things- Robotics with IoT	IoT aided by Robotics
10	Vitality of Robotics in Healthcare Industry: An Internet of Things (IoT) Perspective	Robot Operating System

III.   CONCLUSION

Hence by using this IoT based virtual doctor robot, the burden of a doctor can be reduced during this pandemic situation. The waiting time of the patients can be reduced. Primary patient monitoring and patient caring assistance with daily activities is achieved. For user friendly, we designed "Doctor robot" with manual and autonomous control system. Doctors from anywhere in the world will be able to show the all-patient data without touching the patient through the IoT system and make communicate video calls with the patient. We believe this robot will go a long way in alleviating the lack of adequate doctors in medical services around the world.

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