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A Portable Remote Medical Consultation System for the Use of Distant Rural Communities

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Abstract

Remote medical monitoring and consultation has become indispensable in order to enhance the availability of better health-care services to the patients in remote rural areas in the country. This paper proposes an inexpensive, easy to handle Remote Medical Consultation System (RMCS) which supports the healthcare workers to carry out their services through bi-directional video and voice communication between the remote end and doctor's end as well as automated measuring of medical parameters that can be controlled from both ends. RMCS is consisted of a wearable sensors kit, a centralized hardware platform which connects to the medical sensors and devices and a software platform with database for operating and managing the system. RMCS is capable of remotely measuring patient's blood pressure, heart rate, body temperature, electrocardiogram (ECG), heart sounds and the system's platform supports to add-on more medical sensors or devices. The key aspect of the system is that it reduces most of the complexity in operation and facilitates the doctors to monitor and diagnose the patients in real-time. RMCS was essentially developed to eliminate the issues of low quality healthcare services in rural areas and to assist in monitoring immobilized patients.

Keywords: healthcare; remote medical care; telemedicine; tele-monitoring; body-sensor network (BSN)

INTRODUCTION

Telemedicine is currently being used world-wide to bridge the physical distance and time between patients in remote areas and medical specialists around the world. One of the early examples of telemedicine application was at Massachusetts General Hospital (MGH) and Boston's Logan airport in 1968 to eliminate the need of permanent doctor assignment to airport [1]. In Sri Lankan context, World Health Organization (WHO) initiated a project in 2003 called Health Telematics (SRLHT) with the purpose of obtaining advanced medical consultation regarding a patient's symptoms from other doctors in any of the eight hospitals in five districts where the telemedicine was implemented [2]. SRLHT provided the fundamental facility of sharing information about patients and their symptoms and it was augmented with Voice over Internet Protocol (VoIP) for real time communication during tele-consultation sessions.

The developing countries like Sri Lanka and other South Asian countries can greatly utilize their well-established telecommunication infrastructure to implement low-cost, sustainable telemedicine solutions for the local delivery of primary health care. As Sri Lanka still has higher number of people in rural areas [3], lack of medical resources such as only 3.8 hospital beds per 100,000 population [4] and various adverse factors affecting patients from rural areas such as high transportation cost and physical fatigue caused by