Chapter 15
Tactile Internet and the Remote Surgeon

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ABSTRACT

The delivery of healthcare in remote rural areas is a global phenomenon. Using digital governance, a discretized cluster of node relaying time-sensitive, and reliable data, life-critical health services can be ensured. Here tactile internet-based internet of things (IoT) and its variant internet of medical things (IoMT), as well as tactile internet, is introduced. Its relationship with 5G is explored. A model for e-health implementation using unmanned autonomous vehicles (UAVs) in the backhaul is presented. The link is analyzed over fiber optics, satellite, and 5G network in terms of latency and reliability: the crucial metrics for robotic surgery. It is also shown that 5G implemented in Italy, Zimbabwe, and Cooks Island have supported mobile hospitals in rural regions. Hence, induction of 5G networks is a feasible approach. Finally, a critical review of expected future technologies including telematics is presented. Hence, tactile internet-based robotic surgery can reduce the digital divide.

INTRODUCTION

Digital governance for health infrastructure requires a context for patient-doctor interaction.

Traditional medicine requires diagnosis by a doctor who examines a patient and diagnoses the cure. Initially, the doctor relies on his / her previous training and user experience as well as communication of the diagnosed region of the human body.

Since the 2000s, an estimated 60% of physicians make use of electronic and Personal Health Records. Eventually, there was a need to increase mobility hence the introduction "m-health" or mobile health. Using sensors in an intelligent ambient environment (a-health) have helped in providing in the home health interventions. This in-the-home or district hospital (as compared to city hospital) health care service is the aim of this book chapter. It aims to provide services to a group of users mostly in rural or limited connectivity setting to health provisions which are crucial using state of the art communication infrastructure.

INTERNET OF THINGS

IoT is a novel technology for accessing machine to machine interaction capable of transmitting from any place via the internet to any connected machine or interface or object in a network at any time. IoT will convert the globe and introduce smartness in all aspects. Here smartness implies efficiency, access to data and easy of working without unnecessary human interface. Some examples include smart home and cities, smart health, smart energy and grid, transportation (Kaur & Singh, 2016). In this chapter we focus mostly on the aspect of life saving surgeries or medical provision in remote locations where traditional medical services are not available readily. We designate this variant of the machine to machine interface in terms of medical devices and ecosystems and call it Internet of Medical Things or IoMT.

Internet of Medical Things

IoT allows smart devices to be operated distantly all over the network by uninterrupted incorporation between the real and digital worlds resulting in enhanced efficiency and accuracy. With the ultra-fast connectivity, smart administration, and data competencies, the 5G network supports novel prospects in terms of medical care including imaging, diagnostics, and treatment. IoMT is an amalgamation of smart medical equipment such as clinical wearables and remote sensors that transmit health records such as vital signs and patients 'safety. Smart clinical devices provide diagnosis and cure facilities at affordable prices. Various clinical complexities expect high dependability and accessibility with latency intervals that are dependent on human interaction down to a few milliseconds. Currently, several healthcare applications will profit a range of medical businesses that need high bandwidth and consistent connectivity, and these applications are a function of the evolving 5G test circumstances

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