Patient management through Internet of Things

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Human efforts have been ever directed to ease their life to seek comfort. In the effort to shift, transfer, relegate the work responsibilities to the machines, came in automation. The notions of Smart devices, Smartphones, Smart cars, Smart homes, and Smart cities have been espoused for many years. Five such prominent research areas include Internet of Things (IoT), mobile computing (MC), pervasive computing (PC), wireless sensor networks (WSNs), and cyber-physical systems (CPS).1

The urge to let the machines takeover the monitoring and auto control the patient management, came in IoT. The IoT is the inter-networking of physical devices, vehicles (connected devices and smart devices), buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data.2

The IoT has been on the scene for some years and shown that the Internet is no longer just a global network for people to communicate with one another using computers, but it is also a platform for devices to communicate electronically with the world around them. The result is a world that is alive with information as data flows from one device to another and is shared and reused for a multitude of purposes.3 Connected health remains the sleeping giant of the IoT applications. The concept of a connected health care system and smart medical devices bears enormous potential for the well being of people. Connected health has not reached the masses yet.3

The IoT applications

Internet-connected devices have been introduced to patients in various forms. Whether data comes from fetal monitors, electrocardiograms, temperature monitors or blood glucose levels, tracking health information is vital for some patients. Many of these measures require follow-up interaction with a healthcare professional. This creates an opening for smarter devices to deliver more valuable data, lessening the need for direct patient-physician interaction.4

The IoT devices can be used to enable remote health monitoring and emergency notification systems like blood pressure and heart rate monitors, devices monitoring specialized implants like pacemakers, electronic wrist bands, or advanced hearing aids.5 Some hospitals have “smart beds” that can detect when they are occupied. It can adjust itself to ensure appropriate pressure and support to the patient without the manual support of nurses.4 Another area where smart technology could be an asset is coupled with home medication dispensers to automatically upload data to the cloud when medication isn’t taken or any other indicators for which the care team should be alerted.4 Specialized sensors can be equipped within living spaces to monitor the health of senior citizens, while also ensuring that proper treatment is being administered and assisting people regain lost mobility via therapy as well.6 Other consumer devices to encourage healthy living, such as, connected scales or wearable heart monitors, are also a possibility with the IoT. More and more end-to-end health monitoring IoT platforms are coming up for antenatal and chronic patients, helping one manage health vitals and recurring medication requirements.7 Advancements have seen prosthetic limbs for disabled amputees. The battery powered arm uses myoelectricity, a device that converts muscle group sensations into motor control. The US FDA has already approved these. The arm is nicknamed Luke Arm after Luke Skywalker (Star Wars).8 What was science fiction then is a reality today.

The convergence of the digital and physical worlds, enabled by the IoT, is creating an explosion of data. By 2020, the world’s data will double every two months, with an expected 34 billion IoT devices connecting everything from tooth brushes to turbines and transmitting data to the cloud. However, all the connected devices and big data in the world won’t mean a thing until they are properly applied.9

The IoT technology implementations have the concerns of data privacy and security. While most of today’s devices use secure methods to communication information to the cloud, they are