Real-time health monitoring systems using Internet of Things

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Abstract
With the development of Internet of Things (IoT), the medical data monitoring procedures start to implement the online and real-time data collection using specific IoT type procedures. There are many projects developed in health using IoT dedicated to every generation: form infants [1], working adults [2] and elders [3] as well. The main challenges of this new domain are: the data integration from heterogeneous sensors, the power management of small devices [4] and the management of multiple device users [5]. Our aim was to determine which IoT architecture is the most suitable in which situation. Two groups of students were challenged to create 2 types of IoT based health monitoring systems to collect several types of medical signals like ECG, heart rate, body temperature and other type of data. The first system uses an Arduino based development board and a GSM transmitter and MQTT transfer protocol to communicate with an MQTT broker, in our case the IMPACT IoT platform from Nokia. From the broker the data is saved into a MySQL type database. The second system uses an ESP8266 base development board which has an integrated WIFI transmitter to transfer the collected data into a MySQL type database. After the health monitoring systems were finalized, we have found out that these two approaches are complementary approaches. The first system is feasible when the patient is an active patient who can live an independent life but requires constant health monitoring. The second system is feasible when the patient is checked in some kind of medical care facility, nursing home, etc. and is not immobilized to the bed, but it needs constant monitoring. Both systems enable medical professionals to monitor the patients in real and by choosing the correct architecture the IoT device management requirements can be accomplished.

Keywords:
eHealth; Internet of Things (IOT); Microcontroller; GSM

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