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□ Application domain :- Healthcare

● practical problem the department faces and how we can ammend the situation using IOT applications :

With the ongoing increasing necessities of medical attention, producing and monitoring logs of patients on a physical scale has become dormant, due to the rapid adaptation of all-things-digital.

Catering to this, recent developments in healthcare connectivity technologies have spurred the adoption of an IOT platform for remote sensing (WBS), actuating and intelligent patients' monitoring using advanced analytics and real-time data processing. As this scale is increasing rapidly, there will soon be a problem of getting these disparate ideas to work seamlessly together to realize a large-scale IOT.

The augmentation of wireless sensors (ECG, body temperature, blood sensor (SP02)) with real-world entities (people) through internet enables us to publish our generated data on the Web. By mashing up these "Smart things" with the services and data available on the Web, it is creating new platforms. The healthcare system advices and alerts in real time the doctors / medical assistants about the changing of vital parameters of the patients, such as pulse, body

temperature, and oxygen in blood and about important changes in environmental parameters, in order to take preventive measures.

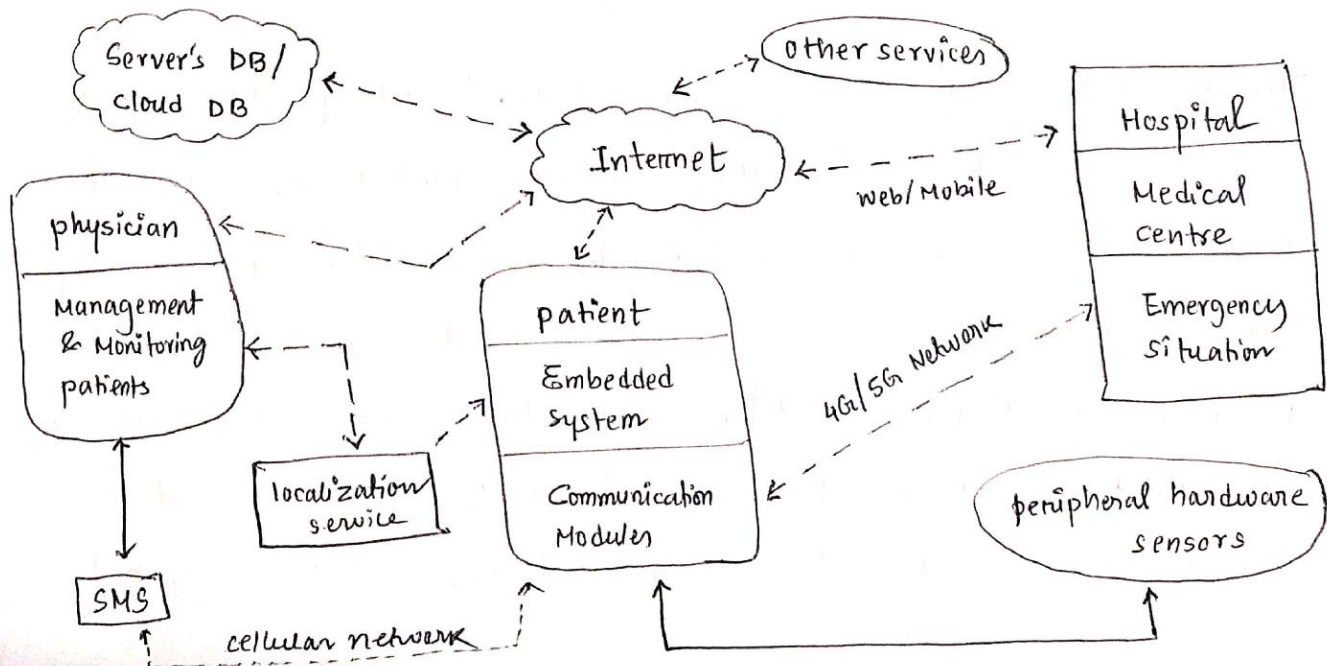
This piece of work puts forward a solution of interoperable protocols of an IoT platform for patients monitoring at risk.

The general architecture is based on interconnected WBS and automatic protocol conversions.

The platform must work regardless of the Internet Connectivity (Wi-Fi, Ethernet) and whatever the protocol of the sensors (ZigBee, Bluetooth,) are implemented.

● Architecture and characteristics of the proposed IoT Healthcare System :

Basic functions of a smart IoT healthcare system is diagramatised as:



In order for the architecture to be called a fully-fledged IoT system, it must adhere to the following characteristics :-

1. Objects of IoT in healthcare should be capable of autonomous data capture most of the times. While most of the sensors do fulfill this criterion, this applies to larger system as well.
2. Applications of IoT and objects that are part of the healthcare system should be inter-operable between different communication technologies.
3. One of the characteristic that could make IoT platform smarter is having possible cooperation between autonomous medical objects. If any two interact and cooperate with each other to accomplish any preset or necessary task, it can intensify value of such application manifold.

□ IoT Level Communication Protocols: _____

The IoT platform which measures Pulse, oxygen in blood, body temperature, ECG wave forms and other services, has access to the interface which receives data from WBS through Wi-Fi, ZigBee, Ethernet and Bluetooth. The connections accept the configuration of protocols communicating on the device. The Networking allows information about network connections such as which networks exist and are connected.

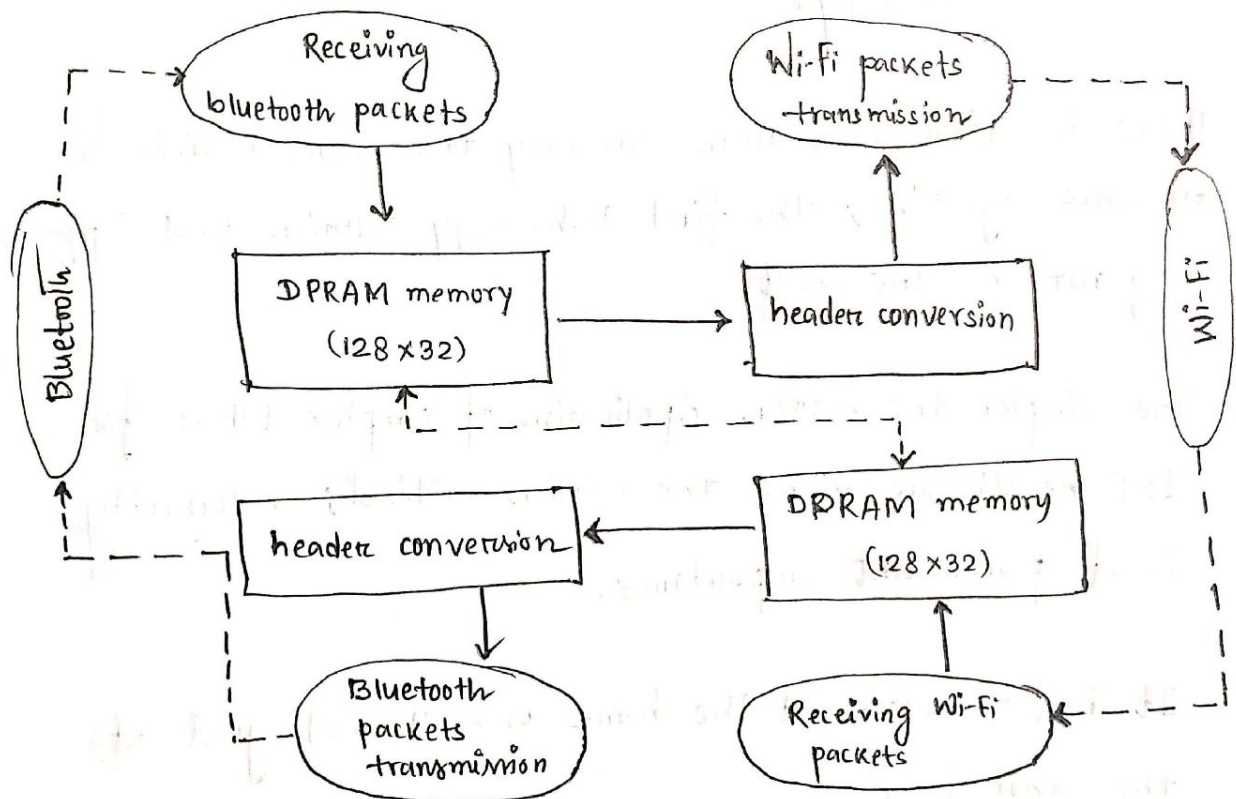
② Multi-protocol platform and their strengths :

1. ZigBee : The ZigBee protocol has developed a very low cost, very-low power consumption, two-way wireless communications standard. Solutions that adopt ZigBee are embedded standards in consumer electronics, PC peripherals, and medical sensor applications.
2. Bluetooth : The functional requirement for Bluetooth networking encapsulation protocol includes the support for common protocols such as IPv6, IPv4, IPX, and other existing or networking protocols such as defined by the Network protocol types.

Although IPv4 and IPv6 are perceived as the most important networking protocols, it is a requirement that Bluetooth Networking is able to support other popular ones.
3. Wi-Fi Direct : It is a newer version defined by the Wi-Fi Alliance aimed at enhancing direct device-to-device communications in Wi-Fi. Thus, given the wide base of devices with Wi-Fi capabilities, and the fact that it can fully be implemented in software over traditional Wi-Fi radios, this technology is expected to have a significant impact.

② Sensors' interoperability:

To connect several sensors in the same platform, there are sensors that run on Bluetooth, ZigBee, etc. and we use Wi-Fi to collect data from platform to the web/mobile. To solve the problem of data exchange, we must think about protocol conversion.



The above HTML interface shows the exchange of protocols:—

1. Wi-Fi to Bluetooth
2. Ethernet to Bluetooth
3. Ethernet to Wi-Fi
4. ZigBee to Bluetooth
5. ZigBee to Wi-Fi

② Key Principles of WBS and their Limitations In Healthcare monitoring parameters :

1. This is an IoT healthcare problem, not a technology-arisen problem. The patient is in the center of interest more than the technology.
2. There is often more than one way to achieve a clinical or care objective; the first technology solution that appears may not be the best.
3. The simpler the better. Application of complex WBSs for IoT healthcare makes the mission critical; reliability is of paramount importance.
4. It has to work at the home as well, not just at the laboratory.

□ Verdict : —

The IoT platform for healthcare system designed in order to help patients, doctors to measure biometric sensor data. The use of wireless body sensors and information technologies provide remotely clinical health care. It helps eliminate distance barriers and can improve access to medical services that would often not be

consistently available in distant communities, thereby saving lives in critical care and emergency situations. The future holds an opportunity to redefine the network to accommodate a wealth of new and diverse connected devices.

□ References : —

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