Effective Ways to Use Internet of Things in the Field of Medical and Smart Health Care

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Abstract: **The health care represents one of the top challenges that every country is facing today. Although health care industry invests heavily in IT, yet the promised improvement in patient safety and productivity has not been realized up to the standards even today organizations still rely on paper medical records & hand return notes to inform hand make decisions.**

The IOT can bring multiple benefits to healthcare through the use of sensors, intelligent equipments, etc. The Internet of Things (IoT) is a new concept that allows users to connect various sensors and smart devices to collect real-time data from the environment. In this project our contribution is twofold. Firstly, we critically evaluate thev existing literature, which discusses the effective ways to deploy IoT in the field of medical and smart health care. Secondly, we propose a new semantic model for patients' e-Health. The proposed model named as 'k-Healthcare' makes use of 4 layers the sensor layer, the network layer, the Internet layer and the services layer. All layers cooperate with each other effectively and efficiently to provide a platform for accessing patients' health data using smart phones

I. INTRODUCTION

An embedded system is a special purpose computer system that is designed to perform very small sets of designated activities. Embedded systems date back as early as the late 1960s where they used to control electromechanical telephone switches. The first recognizable embedded system was the Apollo Guidance Computer developed by Charles Draper and his team. Later they found their way into the military, medical sciences and the aerospace and automobile industries.

Today they are widely used to serve various purposes like:

➤ Network equipment such as firewall, router, switch, and so on.

➤ Consumer equipment such as MP3 players, cell phones, PDAs, digital cameras, camcorders, home entertainment systems and so on.

➤ Household appliances such as microwaves, washing machines, televisions and so on.

➤ Mission-critical systems such as satellites and flight control.

The key factors that differentiate an embedded system from a desktop computer:

➤ They are cost sensitive.

➤ Most embedded systems have real time constraints.

➤ There are multitudes of CPU architectures such as ARM, MIPS, PowerPC that are used in embedded systems. Application-specific processors are employed in embedded systems.

➤ Embedded Systems have and require very few resources in terms of ROM or other I/O devices as compared to a desktop computer.

II. EXISTING SYSTEM

The health care represents one of the top challenges that every country is facing today. Although health care industry invests heavily in IT, yet the promised improvement in patient safety and productivity has not been realized up to the standards even today organizations still rely on paper medical records & hand return notes to inform hand make decisions. Digital information is siloed between departments and applications.

Sharing of patient data among clinicians, departments & even patients is rare and complex. Embracing IoT tech. in health care may be an answer to enabling healthcare organization to focus their efforts on clinical relevant services and patient outcomes which will make health monitoring diagnostics treatment in more timely & convenient manner with the reduced cost

III. PROPOSED SYSTEM

The IOT can bring multiple benefits to healthcare through the use of sensors, intelligent equipments, etc. The Internet of Things (IoT) is a new concept that allows users to connect various sensors and smart devices to collect real-time data from the environment. However, it has been observed that a comprehensive platform is still missing in the e-Health and m-Health architectures to use smartphone sensors to sense and transmit important data related to a patient's health. In this project our contribution is twofold. Firstly, we critically evaluate the existing literature, which discusses the effective ways to deploy IoT in the field of medical

and smart health care. Secondly, we propose a new semantic model for patients' e-Health. The proposed model named as 'k-Healthcare' makes use of 4 layers the sensor layer, the network layer, the Internet layer and the services layer. All layers cooperate with each other effectively and efficiently to provide a platform for accessing patients' health data using smart phones.

BLOCK DIAGRAM:
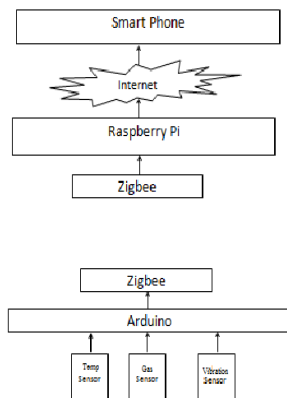
Hardware Requirement:

Raspberry-pi:

Features:

- System Memory – 1GB LPDDR2

- Storage – micro SD card slot (push release type)

- Video & Audio Output – HDMI and AV via 3.5mm jack.

- Connectivity – 10/100M Ethernet

- USB – 4x USB 2.0 ports, 1x micro USB for power

- Expansion

    2×20 pin header for
    GPIOs Camera
    header

    Display header

- Power – 5V via micro USB port.

- Dimensions – 85 x 56 mm

Basic Hardware of Raspberry-PI
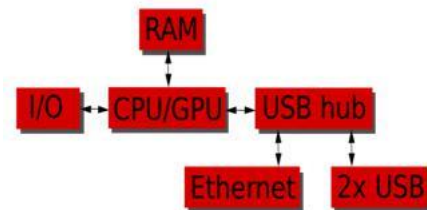
OS used in Raspberry pi is Linux (Raspbian)

Coding will be done in python/C language

Internet of things:

Internet is helping people to communicate each other using different applications

ESP8266EX

- The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.

Worldwide Internet of Things Revenue Opportunity

ARDUINO:

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. The Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode.

Zigbee

The explosion in wireless technology has seen the emergence of many standards, especially in the industrial, scientific and medical (ISM) radio band. There have been a multitude of proprietary protocols for control applications, which bottlenecked interfacing. Need for a widely accepted standard for communication between sensors in low data rate wireless networks was felt. As an answer to this dilemma, many companies forged an alliance to create a standard which would be accepted worldwide. It was this Zigbee Alliance that created **Zigbee**. Bluetooth and Wi-Fi should not be confused with Zibgee. Both Bluetooth and Wi-Fi have been developed for communication of large amount of data with complex structure like the media files, software etc. Zigbee on the other hand has been developed looking into the needs of communication of data with simple structure like the data from the sensors.
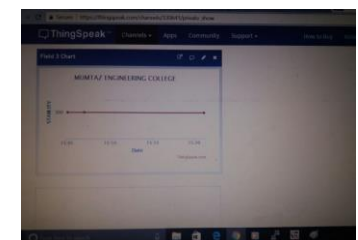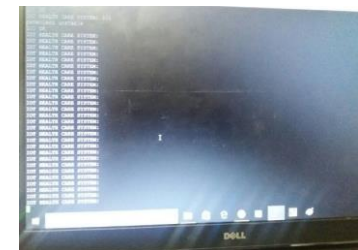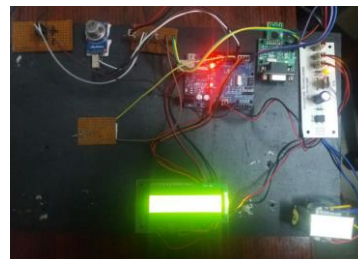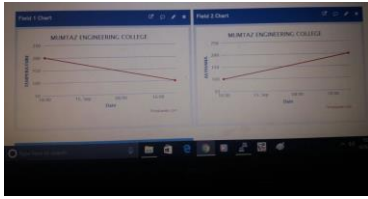

Advantages:

- Ease of operation and understanding.
- Low maintenance cost and handling.
- Fit and forget device
- No wastage of time
- Durability
- Accuracy

Applications:

- Hospitals
- Designed for Home and Clinical Applications

Results:

IV. CONCLUSION

The project **"Effective ways to use IOT in the field of medical and smart health care"** has been successfully designed and tested. It has been developed by integrating features of all the hardware components and software used and tested.

Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit.

Secondly, using highly advanced ARM 11 Processor board and with the help of growing technology the project has been successfully implemented.

V.FUTURE SCOPE

➢ The cost of ARM11 is more that's why in future we can implement this system using ARM CORTEX A8, Beagle bone etc as well as updated processors with high frequencies will work fine.

➢ As the storage space is also less in future we can also record these live streaming data by connecting external memory storage.

➢ We can complete our project using wireless technology.

➢ In future we can provide more security to data by using encryption, decryption techniques.

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