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Design and Implementation of IOT-Based Smart Healthcare Data Communication System

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ABSTRACT: *Today remote monitoring system is emerging to collect remote data. In this project, we are monitoring various parameters of the patient using Internet of Things (IoT). In the patient monitoring system based on Internet of things project, the real-time parameters of patient's health are sent to cloud through Wireless system using Internet connectivity. These parameters are sent to a remote Internet location so that user can view these details from anywhere in the world. This system secured with industry 4.0.There is a major difference between SMS based patient health monitoring and IoT based patient monitoring system. In IOT based system, details of the patient health can be seen by many users and real time samples are available. The reason behind this is that the data needs to be monitored by visiting a website or URL. This is one of the Latest Emerging Technique in Medical applications and Industry 4.0. One more benefit of using IoT is that, this data can be seen using a desktop computer, laptop, using an Android smartphone or Tablet. The user just needs a working Internet connection to view this data. There are various cloud service providers which can be used to view this data over Internet. Things speak, Sparkfun and IoT Geek are few famous and easy to use service providers among these.*

Keywords: *PHY,MAC,CMS,PSD.*

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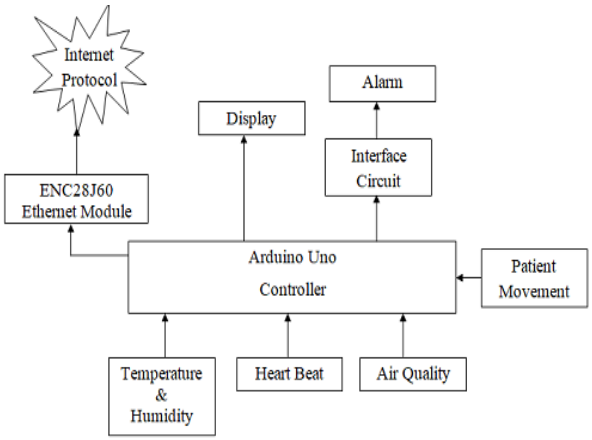
I. INTRODUCTION:

The healthcare business has had fast expansion and is a significant contributor to revenue and jobs. A few years ago, the only way to diagnose diseases and abnormalities in the human body was to undergo a physical examination at a hospital. The majority of the patients had to stay in the hospital for the duration of their therapy. This boosted healthcare costs while also straining healthcare facilities in rural and isolated areas. The technical advancements made over the years have now enabled the detection of numerous ailments and health monitoring using tiny devices such as smart watches. The safe vault, which is a group of keys of similar sizes, is the shared secret between the Internet of Things server and the Internet of Things device. The secure vault's initial contents are shared between the server and the IoT device, and they are updated following each successful communication session. To demonstrate that our technique is workable on IoT devices with memory and computing power limitations, we implemented this process on an Arduino microcontroller [1]. We evaluate the effects of various server-side stream processing architectures for ingestion and instantaneous analysis of IoT sensor data. Our real-time IoT platform, Namatad, uses actual building sensor data. Due to the various levels of granularity in the ingestion and routing process by which we transfer data into the analytical pipelines, we have measured and assessed the latency and QoS impact [2]. This approach was tested for identifying and describing animal posture-related disorders, with early results looking promising. This study compares the algorithms that were tried because numerous algorithms were [3]. Using a cutting-edge IoT architecture, we suggest an integrated indoor environmental monitoring system in this research. To address the variability of environmental data in a smart home setting, a fuzzy-based rule architecture is used. The framework's innovative feature is that it was created with decision-making modules and a modular repository[4]. In this study, the IoT technology and current energy meters were merged. The use of electrical energy can be made easier for customers by implementing IoT in the case of reading power meters[5]. In line with Design Science research methodologies and taking into account stakeholders' perspectives from the automotive and aviation industries, this article suggests a microservice for team building to allow collaborative production in the context of Industry 4.0 [6].

II. SENSING STATION

Any physiological parameter, including blood pressure, glucose levels, and blood oxygen saturation, can be measured. Low power microcontrollers are directly connected to the sensors. The Wi-Fi module was then linked to these microcontrollers. When a human parameter changes, the sensor will detect the change and give an analog signal in response. If the server is close enough to the sensor's Wi-Fi range, the microcontroller, which

has an internal ADC, will convert the analog signal from the sensor to an equivalent digital value and calibrate it to its unit scale.



III. HARDWARE DESIGN

- **Power supply unit:**

A Power supply unit supplies Direct Current (DC) power to the other components in a circuit. It converts general-purpose Alternating Current (AC) electric power from the mains (to low-voltage.

- **Step down transformer:**

When AC is applied to the primary winding of the transformer it can either be stepped down or stepped up depending on the value of DC needed. In our circuit the transformer of 230v/15v is used to perform the step down operation where a 230V AC appears as 5V AC across the secondary winding.

- **Rectifier unit:**

In the power supply unit, rectification is normally achieved using a solid state diode. Diode has the property that will let the electron flow easily in one direction at proper biasing condition.

- **Voltage regulator:**

A voltage regulator is a power supply unit component that maintains a consistent voltage supply under all operating conditions. It controls voltage during power fluctuations and load variations. It is capable of regulating both AC and DC voltages.

- **Arduino controller:**

Arduino is a free and open-source electronics platform with simple hardware and software. Arduino boards can read inputs such as a light on a sensor, a finger on a button, or a Twitter tweet and convert them into outputs such as operating a motor, turning on an LED, or publishing anything online.

- **Communication:**

The Arduino Uno includes a number of communication ports for connecting to a computer, another Arduino, or other microcontrollers. The ATmega328 supports UART TTL (5V) serial communication via digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels serial communication over USB and appears to software on the PC as a virtual com port.

- **Arduino Ethernet Shield:**

The Arduino Ethernet Shield V1 connects an Arduino board to the internet. The Wiznet W5100ethernet chip (datasheet) serves as its foundation. The Wiznet W5100 includes an IP stack that supports both TCP and UDP. It can support up to four concurrent socket connections.

- **Sensors and interfacing:**

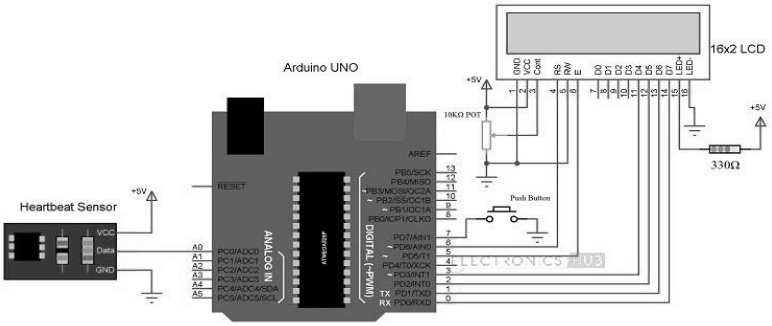
Sensors primarily detect the state of a physical quantity. We are employing sensors to measure the temperature, humidity, soil moisture, and flow of water in the irrigation area.The DHT11 temperature and humidity sensor is used to measure the temperature and humidity of the irrigation field. Soil moisture sensors are used to measure soil moisture, and water flow sensors are used to measure the flow of water in the motor output.

- **DHT11 Sensor Interface:**

In this project, we will build a small circuit to interface Arduino with DHT11 Temperature and Humidity Sensor. One of the main applications of connecting DTH11 sensor with Arduino is weather monitoring in agriculture field.

- **Heart beat sensor interface:**

Heartbeat Sensor is an electronic device that is used to measure the heart rate i.e. speed of the heartbeat. Monitoring body temperature, heart rate and blood pressure are the basic things that we do in order to keep us healthy. we have designed a Heart Rate Monitor System using Arduino and Heartbeat Sensor.



IV. CONCLUSION

The availability of low-cost single-chip microcontrollers, as well as developments in wireless communication such as IoT and Industry 4.0 technology, has motivated engineers to design low-cost embedded systems for healthcare monitoring applications. Such systems can process real-time signals generated by biosensors and transfer the measured signals to the medical center's server via the patient's phone. The functionality and readings of the implemented prototype have been designed, and hardware development is underway. The suggested system has the following features: Its functionality is comparable to that of standard monitoring systems used in hospital Intensive Care Units (ICU). It can be used as a portable gadget linked to the patient's mobile phone via Bluetooth connection module. The same device can be used as a home internet device. In this situation, the device can perform additional tests such as glucose, uric acid, cholesterol, and others.It can be used to deliver medical advise to a patient based on real-time physiological data. Real-time monitoring of patient status is necessary to detect and resolve concerns before a crisis occurs. The outcomes of real-world tests motivate us at Philadelphia University-Jordan to pursue additional development and the possibility of marketing in the near future.

REFERENCES

[1]. Huang-Chen Lee et al., "Design of Multifunctional Wireless Sensor for In-Situ Monitoring of Debris Flows", IEEE Transactions on Instrumentation and Measurement, vol. 59, pp. 2958-2967, 2018
[2]. Vo Minh Huan, "Online Working Condition Monitoring System Integrated Power Saving And Security Using Zigbee Wireless Sensor Network", IEEE ATC Conference, October, 2017.
[3]. F. Douma, R. Braham, "A NEMO-LISP based architecture for mobility support in medical Body Area Networks", CEIT, 2016.
[4]. Chinmaya Vyas, Shashikant Patil, "Smart Home Analysis in India:An IOT Perspective", IJCA, vol. 144, no. 6, June 2016.
[5]. M. Suruthi, D. Nivetha, "A Survey on Challenges Technologies and Applications of IoT", IJARCCE, vol. 5, no. 3, March 2016.
[6]. Akshay Gapchup, Ankit Wani, Durvesh Gapchup, Shashank Jadhav, "Health Care Systems Using Internet of Things", IJIRCCE, vol. 4, no. 12, December 2016.
[7]. Qinghai Ou, "Application of Internet of Things in Smart Grid Power Transmission", Third FTRA International Conference, Sep 2017.
[8]. Jorge E. Luzuriaga, Juan Carlos Cano, "Handling mobility in IoT applications using the MQTT protocol", (ITA), 2015.
[9]. Baggio, A. Wireless sensor networks in precision agriculture. In ACM Workshop on Real-World Wireless Sensor Networks (REALWSN 2005), Stockholm, Sweden (pp. 1567-1576),2023.
[10]. Wang, N., Zhang, N., & Wang, M. Wireless sensors in agriculture and food industry—Recent development and future perspective. Computers and electronics in agriculture, 50(1), 1-14.2022.
[11]. Riquelme, J. L., Soto, F., Suardíaz, J., Sánchez, P., Iborra, A., & Vera, J. A. (2019). Wireless sensor networks for precision horticulture in Southern Spain. Computers and electronics in agriculture, 68(1), 25-35,2019.

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