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AN INNOVATIVE SMART HEALTH CARE SYSTEM BY USING INTERNET OF THINGS (IOT)

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Abstract - The Internet of Things (IoT) plays a significant role in a broad range of healthcare applications, from managing chronic diseases at one end of the spectrum to preventing disease at the other. The IoT provides an efficient and new life to the healthcare field. One of the better way the doctors are capable to certainly and quickly right to use the relevant patient information, including the patient medical history. Through the Internet of Things, tremendously improves the quality of information and the patient care in the Medical field. A sensor based automating design methodology for smart physical health system using IoT. This helps to create a rehabilitation strategy and reconfigure medical resources according to patient's specific requirements rapidly and repeatedly.

Index Terms – Healthcare, sensor, Internet of Things (IoT), smart recovery, Resources optimizations

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I. INTRODUCTION

When one thinks of the Internet of Things (IoT), typically connected homes and connected community come to mind. Medical applications, however, are rapidly coming to the forefront, too. From diagnostics and monitoring to medical delivery methods, the IoT marries communications and sensor output to deliver functions that recently were only conceptual in nature. IoT enables devices to gather and share information with each other and the cloud so that data streams can be collected and analyzed accurately and at breakneck speeds. In particular, Baby Boomers, a large (about 78 million Americans) generation born in the 25 years following World War II, are hitting retirement age and many have new medical needs. This is the very generation that at one time struggled to program something as simple as their VCR. Fortunately, sensor-based IoT medical advancements will, for the most part, eschew the need for programming tasks and come in the form of mobile, miniature devices that are amazingly effective and work in the background without user intervention. These devices will be worn, embedded, or cloud-based, communicating wirelessly. Eventually the global system of medical IoT devices will comprise billions of devices and applications using sensors, actuators, microcontrollers, mobile-communication devices, and more. Consequently, healthcare based on an individual's needs will not only be delivered more effectively but also, because of economies of scale, promises to be lower in cost.

II. RELATED WORK

Made possible by advances in sensor and interconnect technologies, healthcare can now include collecting patient data dynamically to foster preventive care, diagnostics, and even measure treatment results. Automation and real-time aspects reduce errors and improve quality and efficiency. Today, wireless sensor-based systems gather medical data that was never before accessible and deliver care directly to patients. IoT-related healthcare is based on IoT as a network of devices that connect directly with each other to capture and share vital data through a secure service layer (SSL) connecting to a server in the cloud. It combines sensors, microcontrollers, microprocessors, and gateways where sensor data is further analysed and sent to the cloud and then on to caregivers. Remote monitoring translates into a greater number of patients worldwide having access to adequate healthcare. Data is captured via sensors, complex algorithms analyse the data, and medical professionals can wirelessly access the information and make diagnoses and treatment recommendations. Patients can also be monitored around the clock so that subtle changes are detected and drug intoxication is avoided. As the population ages, seniors living independently may use a monitoring device to detect a fall and report it automatically to emergency responders. Strategically-placed sensors can monitor daily activities and report anomalies to care providers or family members via cell phone. Applications processing and wireless connectivity can be embedded in mobile personal health gateways to monitor vital body parameters and manage health.

A key challenge for IoT healthcare—standards putting a wealth of complex devices together is problematic on several levels. One in particular involves standards. IoT will rely on even greater standardization of communications protocols in the future. Work is ongoing to create guidelines for wireless communications between monitoring devices that share data with care providers. Designers must be aware of standards activities that include such efforts as:

- The Continua Health Alliance, a coalition of healthcare and technology companies created to establish guidelines for interoperable personal health solutions. It has a set of specs already in place for interoperability so that Continua-certified devices will work with other Continua-certified devices for IoT use, guaranteed.
- IEEE standards for LANs define Wi-Fi (IEEE 802.11) and ZigBee (IEEE 802.15.4) networks. PAN standards include Bluetooth and BLE, IEEE 802.15.4j, IEEE 802.15.6, associated with body area networks (BANs).
- Cellular network standards involved include GSM/UMTS and CDMA.
- In all, the U.S. Food and Drug Administration (FDA) has recognized and listed 25 standards that support medical-device interoperability and security.

III. WORKING PROCEDURE OF PROPOSED WORK

The DLVR is a digital sensor with a signal path that includes a sensing element, a 14- bit analog-to-digital converter, a DSP, and an I/O block that supports either an I²C or SPI interface (Figure1). The sensor also includes an internal temperature reference and associated control logic to support the configured operating mode. The sensing element is powered down while not being sampled to conserve power. Since there is a single ADC, there is also a multiplexer at the front end of the ADC that selects the signal source for the ADC.

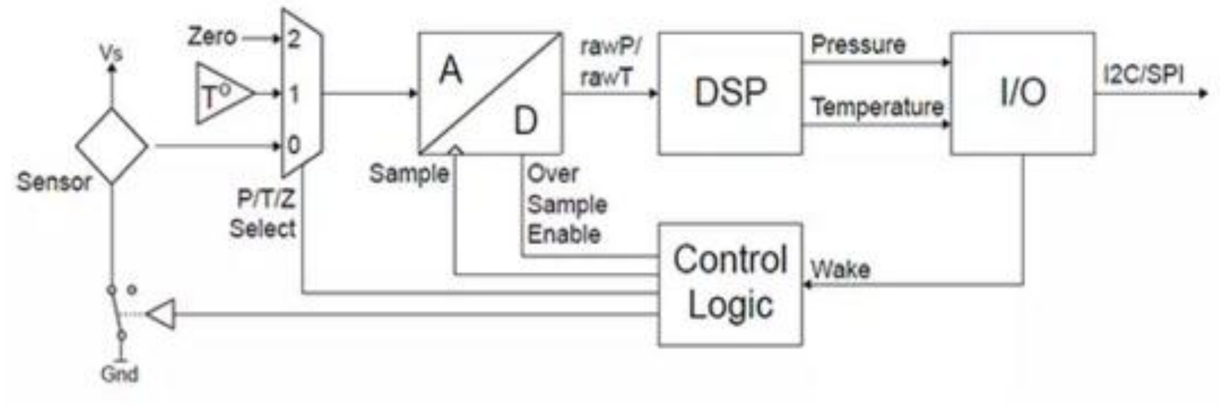

Fig. 1: Essential function of the All Sensors DLVR

Supply voltage options ease sensor integration into a wide range of systems, enabling direct connection to serial-communications channels. In battery-powered systems, the sensors can tap into very-low-power modes between readings, minimizing the load on the power supply. The calibrated and compensated sensors deliver accurate, stable output over a wide temperature range. Used with non-corrosive, non-ionic working fluids, such as air and dry gases, there is also a protective coating optionally available for moisture/ harsh media protection. Within the medical arena, it is used in medical breathing, environmental controls, and portable/handheld equipment. Used for respiratory therapy in medical applications, the series features a precision- relative humidity sensor, temperature sensor, auxiliary-second-zone-sensor input, a wide-operating-voltage range, I²C host interface, and 3 mm x 3 mm DFN package. It provides long-term stability and factory calibration. Healthcare in hospitals or remote settings is not the only medical segment involved in IoT. Fitness, health electronics, and even smart watches have a role to play in monitoring, providing feedback, and in some cases a link to medical professionals. A useful part in a fitness "wearable" monitor is the Silicon Labs' Si1132 UV Index and Ambient Light Sensor IC with I²C interface.

The integrated-UV-index sensor features a digital-UV-index register that can be read through I²C interface, factory calibration to address part-to-part variation, an integrated-ambient-light sensor, and 100 millilux resolution, allowing operation under dark glass. Applications include fitness, health electronics, and smart watches. This sensor IC includes an analog-to-digital converter, integrated high-sensitivity visible and infrared photodiodes, and digital-signal processor. The Si1132 offers excellent performance under a wide-dynamic range, and a variety of light sources including direct sunlight. Si1132 devices are provided in a 10 lead 2 x 2 mm QFN package and are capable of operation from 1.71 to 3.6 V over the –40 to +85°C temperature range As it is important to monitor patients and seniors to identify fall events, an inclinometer is the sensor at the heart of this application. An example is the programmable 360° inclinometer ADIS16203, from Analog Devices (Fig. 2).

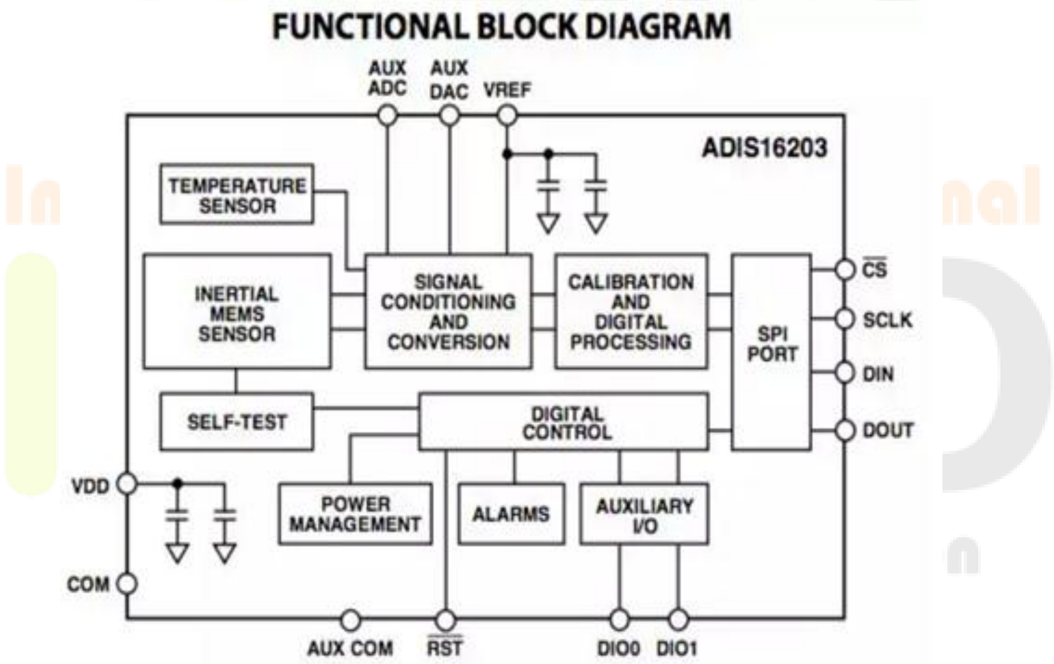

Fig. 2: Need to detect a fall? An inclinometer, Analog Devices ADIS16203, is essential

IV. CONCLUSION AND FUTURE WORK

Finding application in tilt sensing, motion, position measurement, monitoring, and alarm devices, this part is an incline-angle measurement system in a single compact package. It features Analog Devices' iSensor technology. Typical iSensor integration allows system insertion with only a power supply and a serial-port interface. Combining the company's iMEMS-sensor technology with embedded-signal processing provides factory-calibrated, sensor-to-digital incline-angle data in an accessible format using a serial-peripheral interface (SPI). Easy access to calibrated-digital-sensor data provides a system-ready device that lowers cost, program risk, and development cost.

Sensors are devices that detect physical, chemical, and biological signals and provide a way for those signals to be measured and recorded. In healthcare and fitness "Internet of Things" devices, sensors can monitor temperatures, pressures, chemical, and biological levels of users and/or patients. Sensor technology will in this way change the role of hospitals, outpatient sites, homes, and ambulatory programs.

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