

IoT Based Personal Medical Assistant System

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Abstract - Medical field has been considered as a crucial part of human society. With advanced technologies in communication, several public sectors and industries have been equipped with the remote controllable and multiuser based systems. With the discoveries of cloud computing, wireless sensor network, android based systems and Ethernet connectivity, users can control the automated systems from any place in the world. This paper mainly focuses IoT based personal medical assistant system.

Index Terms - ARM microcontroller, Health parameters, IoT, Medical Assistant.

I. INTRODUCTION

A modern health care system along with embedded system can take care of the patients considering medical aspects including personal medication, monitoring various signs [8]. This work mainly focuses on Digital Personal Medical Assistant system. The primary objective of this work is to assist the patients including elderly persons, taking medicines without missing the prescribed time, routine health check-up including body temperature, pulse, blood oxygen saturation levels etc. If patient can't take medications as per prescription means on time and correctly then it may cause illness, delay in recovery and sometimes may lead to a death too.

The Digital Personal Medical Assistant can inform and alert the patients to take the proper dose at the right time. Using IVRS (Interactive Voice Response System), it provides direct communication with the patients and the caretakers as it will immediately notify the caretaker in case the patient missed his/her pill and also in case any consequences like body parameters such as temp, oxygen saturation, pulse etc.

II. HUMAN HEALTH PARAMETERS AND HEALTH DEVICES

A. Health Parameters

Health is basically a physical state. This state is from injury and illness. The body is said to be healthy when the human body functions well and the body is in good condition. The body status as healthy or not can be decided with the help of health parameters including temperature, heart beats, ECG, blood composition, pulse rate, bone density, urine constitution, oxygen level count etc. To measure some of the health parameters we need to have a special arrangement and the complex devices. The common health parameters include temperature, sugar (blood glucose) count, oxygen level, pulse rate [9].

B. Health Devices

As per thermo-regulation, human body can control the temperature of the body at constant temperature with the help of a natural mechanism [10].

A normal sugar level for adult non-diabetic human being is less than 100 mg/dL without eating for 8 hours. Now low blood sugar may create problem with nervous system and the symptoms include lightheadedness, dizziness and weakness. Lack of glucose may lead to headache problem. Also patient may suffer from stress, anxiety, nervousness and irritability. High sugar level may cause a serious health issue. The health issues include kidney disease, stroke, vision issues etc. Hence, monitoring of sugar level of the patient is crucial one [11].

The heart rate of the human is the pulse rate. It is the count of heart beats per minute. The normal pulse rate ranges from 60 to 100 for the ages 18 above. For children (ages 6-15) the pulse rate ranges from 70-100 [12]. The pulse rate measurement is also important as a part of health check-up of the patient.

III. LITERATURE REVIEW

The researchers contributed in the application of Digital Personal Medical Assistant system. We have reviewed the literature in connection with medical assistant system.

Suneetha Uppala and B. Rama Murthy have designed a medicine reminder using Atmega microcontroller [1]. The system had buzzer and LCD screen to indicate the pill consumption.

Viral Shah et al. have designed a smart medicine box using FRDM-KL25Z based on the Freescale KL25Z, with a 32-bit ARM Cortex-M0+ core running at 48MHz [2] The system had LED and speakers as alarm and LCD as indicator.

Application of ARM 7 to design the medicine box has been developed by Naga Nyapathi et al. [3]. The system consists of different pill boxes, LED and keyboard.

Akash Saliga et al. have developed smart pill box based on ARM 7 using load cell and astable multivibrator [4].

Sanjay Bhati et al. have designed Smart Medicine Reminder Box using Arduino [5]. The use of system was limited to the pill consumption time management only.

Sonam V. Maju has designed A Secure Health IoT for Patient Monitoring with Intelligent Medicine Box using Arduino [6]. The system is improved medicine box with internet connectivity provision.

P. Raga Lavima1, G. Subramanya Sarma used LPC2148 microcontroller board based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support to design the IOT based intelligent medicine box [7]. These systems have multiple sensors and IOT facility.

IV. PROPOSED METHODOLOGY

A block diagram of proposed system is depicted in Fig. 1 as below. The detailed working of proposed system is explained below.

A. Hardware

The hardware of the system will function as below.

1. Sensors

Temperature sensor will be used to measure body temperature. Glucose sensor will be used to measure the blood sugar content and pulse sensor will be used to measure the pulse rate.

2. Microcontroller

ARM cortex microcontroller will be used in the proposed work. After taking the input from sensors it will process data and convert that data into proper

format for further use. It means ADC module is required to convert data into digital format.

3. Ethernet connectivity

Ethernet connectivity will be given to the prepared system with which it can be connected to the internet.

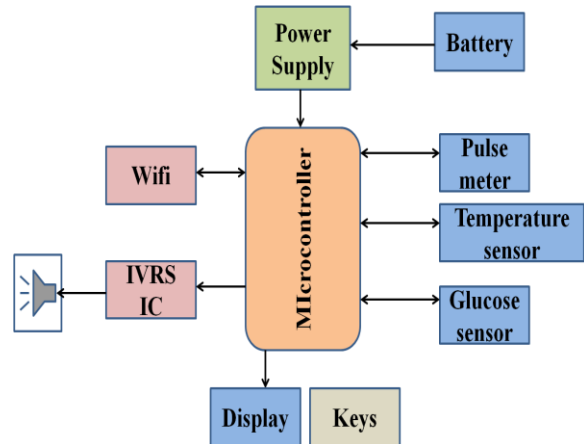


Fig. 1 Block diagram of proposed system

B. Software

Suitable softwares necessary for interaction between sensors and ARM microcontroller will be used as per the need.

V. CONCLUSION

The medical assistant is the need of today's world. In this work, we focused a system which mainly outlined a digital personal medical assistant. In this paper, we presented a literature survey in the field of medical assistant systems. Also we presented a proposed system in connection with a digital medical personal assistant. The future work of this paper will extend the implementation of the proposed system.

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