IoT-based Health Monitoring System with Medicine Remainder using Raspberry Pi

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Abstract. In this busy rivalry-world, we can not persistently evaluate our elderly (mature persons) and patients, even though we love them too much. By using advancements in latest technologies, we build up this idea to save time and easy to understand. Our primary motive is to constantly monitor the health of the patient. In the execution of this proposal, we primarily have three separate modules: 1) wellbeing surveillance modules; 2) informants on ingestion of medicines; and 3) spokespersons.

Keywords—Raspberry Pi, IoT, heartbeat sensor

1. Introduction

Due to the increasing number of seniors in metropolitan areas, it is important to build urban communities in such a way as to address the growing needs of older people[1]. His intelligent wellbeing will also build enticing doors to the stability and quality of life within people's neighbourhoods and challenges in understanding the achievement of shaky metropolitan neighbourhoods. The proposal to provide moderated human care in shrewd urban areas [1] and [2] is being created by KEEN Health. A crucial factor in the establishment of keen metropolitan societies for better health care has been the potential of the genius wellness technologies and the enormous amount of genius human resources device and sensors. Because of the increasing number of elderly and weakened persons, the need to continuously observing the system for the loss of knowledge on patients' care facilities is severe. With the quick improvement of cell phones (e.g., advanced mobile phones and tablets), and keen home innovation alongside the expanding prevalence of brilliant wellbeing, has empowered a developing number of human services professional to get to various sorts of social insurance media (e.g., X-beam, MRI, confront, voice of patients), for quality and reasonable care [3], [4] and [5]. With this late advancement and notoriety of shrewd wellbeing application, it is anything but difficult to get to the human services information in a split second and impart to different parental figures for conceivable care. This simple access to medicinal services media content raises a genuine worry about the elderly patient's condition, whether he is typical, strained, or in agony for quality care or checking. In this regard, a multimodal framework is required, which can utilize both discourse and recordings for distinguishing the condition of a patient for conceivable observing.

2. Problem Definition
To get his administration the customer must click the person grab, and then the predefined message is played through the speaker. Many patients usually fail to take the appropriate treatment course in proper conditions. Chances may be that you can remember to take pills in customary conditions, but don't look at the pill to be taken during this particular duration [6]. This is an important challenge and it is impossible for specialists to accurately test patients. Moreover, it is not, for the most part, convenient and usable for the doctor to employ a single patient as an attendant. In order to prevent these complications, we have an improved project that will alert the patient that medications are received at regular times and give reports about the patient to the doctor if the temperature or pulse surpasses the regular set point. This definition is mainly meant for patients and elderly persons.

3. Proposed Methodology

This project goes for observing the patient's wellbeing conditions constantly. Three specific modules can be used in the project
1) Module for health surveillance
2) Prescription admission source
3) Voice guider

3.1. Health monitoring

This module includes pulse and temperature sensors to quantify independently the patient's pulse and temperature. If either of these parameters exceed the specified value, the system sends the predefined message to the doctor immediately via the IoT. He analyses the patient constantly in the end of the day. The remote concept, IoT[7], is used in this project. User is accommodated by the crisis transition associated with the basic module. Should he believe he wants help from the specialist immediately, he can pinch this switch and the raspberry pi will receive the feedback from this switch and automatically send the predefined message to the specialist.

![Proposed block diagram](image)

**Figure 1.** Proposed block diagram

3.2. Prescription Admission Source

A RTC (DS1307), a buzzer and LCD 16x2 monitor are present in the drug admission source. The framework constantly looks at RTC time and compares with time, this time and now and if the two conditions co-ordinate, it immediately alarms the patient's buzzer for a predefined time and specifies the name of the patient's medications on the LCD.
3.3. Voice Guider

APR9600, speaker and IR receptor provide the speech reference. If the patient or old individual neglects to take pharmaceutical, then voice guider will remind with the medicine name. As of now we store the prescription through PC into EEPROM and voice in module channels. If, the patient heartbeat surpasses the typical heartbeat then controller send message to the registered mobile number. Key1 and key2 keys are utilized for loads ON/OFF by squeezing keys. The crisis key is squeezed voice play "require emergency".

4. Hardware Description

4.1. Raspberry Pi

It is an ultra-cheap minicomputer with 5.5 cm width and 9 cm length. It consists of a component named System on Chip (SoC) which comprises of single core CPU with a supportive processor for computing floating points, GPU and RAM with 512 MB size (SD-RAM). Moreover, it consumes less power, which is just around 5-7 watts. The architecture of raspberry pi is given in figure 2 and figure3 and the specifications are shown in Table1. It has couple of cache memory levels, where first level is of 32KB size and the latter is of 128KB size. These are utilized to store recent programs and ALU is utilized to execute instructions.

![Image of Raspberry Pi architecture](image)

**Figure 2.** System architecture of raspberry pi

| Chip          | Broadcom BCM2835 SoC |
|---------------|----------------------|
| Core architecture | ARM 11               |
| CPU           | 700 MHz Low power ARM1176JZFS |
| RAM           | 512 MB (SD-RAM)      |
| OS            | Linux                |
| Dimensions    | 85.6 × 53.98 × 17 mm |
| Power         | Micro USB socket, 5 V, 1.2 A |

**Table 1.** Specifications of Raspberry pi
It is a very small device and can incorporate other devices also. It consists of both the hardware and software. It requires an SD card and a power supply to related mouse and keyboard. Additionally, a display also exists for functioning OS such as Windows and Linux.

![Figure 3. Raspberry pi](image3.png)

5. Experimental Analysis

This provides a short overview of the hardware configuration of the proposed intelligent elderly health monitoring system. The numbers below are pulse rhythm and temperature sensors, which are used for monitoring the patient's heartbeat. The values will be displayed in LCD as shown in figure 5 and figure 6. If one parameter reaches the set point, the machine sends the predefined message to the doctor immediately via IoT. In other terms, the practitioner will continually identify the patient.

![Figure 4. Overall Implementation](image4.png)

The wireless principle is used in this project. The emergency switch shown in the figure 4 is connected to the user 's key module. If he feels he wants assistance urgently, he can click the switch and the processor understands the feedback and sends him a predefined message without hesitation.

![Figure 5 Closer view of display](image5.png)
6. Conclusion

Due to the increasing number of mature communities, it is vital to produce urban areas along these lines so that they can meet their residents' exceptional needs, particularly elderly people. In accordance with this essay, the main components of urban shrewd areas are coordinated with knowledgeable home human services in relation to genius urban populations, e.g. by high-prescription, smart transports, smart schooling, intelligent governance, clever homeland, intelligent living and safety. This essay also introduces the most critical aspect of shrewd urban areas. In a clever home public care case, a system for a patient or elderly subject management has been suggested. Two ways of viewing the condition: voice and film. The exploratory findings revealed that the frame can be used in a colourful home as part of the patient’s condition. Regarding the potential jobs, by sending the model out in the blankets, we calculate further workload.

7. References

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