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# Hypertension Tracking System Powered by the Internet of Things

Mr.R.Vijaysai
*Department of Computer Science and Engineering,Faculty of Computer Science and Engineering, K S Rangasamy College of Technology*
Tiruchengode, India
vijaysair@ksrct.ac.in

Vignesh N
*Department of Computer Science and Engineering,Student of Computer Science and Engineering, K S Rangasamy College of Technology*
Tiruchengode, India
viratvickyking143@gmail.com

Rajesh C R
*Department of Computer Science and Engineering,Student of Computer Science and Engineering, K S Rangasamy College of Technology*
Tiruchengode, India
rajesh1001sujin@gmail.com

Rajeshkumar P
*Department of Computer Science and Engineering,Student of Computer Science and Engineering, K S Rangasamy College of Technology*
Tiruchengode, India
rajeshkumarpp6776@gmail.com

***Abstract*—Annually, more people are admitted to hospitals, and some of them require routine blood pressure checks from health professionals. In order to ensure that the results are correct, the medical team must usually visit to the person and take many readings during each session. As a result, Malaysian hospitals, tracking procedures need to be made simpler. The Hypertension tracking system powered by the internet of things used in this study is created to directly monitor patient hypertension. In this project, the Raspberry Pi serves as a portal for viewing the hypertension number online. The system can transmit data from a blood pressure monitor across a network using a USB TTL serial connection that is connected directly to a Raspberry Pi, according to test results. The WhatsApp app and email platform both allow users to continuously monitor their hypertension. Additionally, the technology can precisely measure hypertension while the person is seated.**

***Keywords— Hypertension, Email, Internet of Things, Raspberry Pi, WhatsApp.***

## I. Introduction

In its most latest report, the National Compliance Department noted that several Malaysian hospitals, ETD were overloaded, overworked, underpaid, and inadequately provided. The Department of Health is under enormous pressure to provide health care to all Malaysians towards the best of its abilities as the amount of patients keeps rising. Therefore, it is necessary to streamline the monitoring procedure within the Malaysian hospital. Having an online tracking system that displays every situation in engineering is simpler. One approach is to keep an eye on the patient's condition via the Internet of Things. Many technologies are being created and used today to improve the effectiveness of hospital administrators. An Internet of things hypertension tracker was created to assist hospital workers in tracking individual a patient's blood pressure reading. This will improve how doctors take decisions based on medical status in real time and decrease the reliance of patients on medical staff. For disabled people who may find it difficult to travel to the hospital to examine on their status, an Internet of things hypertension tracker is also helpful. The system has the capacity to move the location of medical services from the patient's house to the clinic. The hypertension trackingtechnique has recently experienced extensive research and developed from several types, including digital, aneroid, and conventional healthcare devices. It was suggested to use an Arduino-based health tracking system, where data is transferred to a computer for analysis using Software simulation. The Raspberry Pi module served as the processor in this system that sent the server the status of a patient's health tracking. The data was provided to a website that updates every 60 seconds, suggesting a healthcare tracking system. In contrast to many other works that employed databases to track the performance of the built system, this approach sends output to mobile applications and Email rather than a personal computer. The proposed method in this research is more mobile, allowing the doctor or hospital personnel to check on the patient whenever necessary. The remainder of the essay is structured as follows. The summary of the research methodology employed in this work is described in Section 2. Section 3 elaborates on the conclusions and analysis, and Section 4 is where the author draws a conclusion about the article's results.

## II. Study Methods

Both computer and network execution are part of this project. Figure 2a flow chart shows the structure of the system that was created. The Raspberry Pi, which controls the entire system, is capable of detecting data from the hypertension gadget and transmitting it over the internet so that users may examine it in the WhatsApp and email applications. Anyone with the authority to examine the relevant data on the server can view this application.

Fig 1: Flow chart of a network*Accessing applications*

A few software programs have been employed to ensure the project's effective completion and execution. A tracking tool called H-term is applied to read and view the analog data sent from a hypertension tracker to a personal laptop. The display of the H-term software can consistently

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show three different sorts of data on the hypertension tracker. Another piece of software used in this project was Putty, which was employed as a system file sharing tool. The software used to run the programme on the Raspberry Pi is called PuTTy. To utilisePuTTy, one must confirm that the Raspberry Pi's IP address has really been verified and entered properly. To ensure that the PuTTy and the Raspberry Pi device can connect, this is done. It demonstrates that the Python scripting language is run using the PuTTy technology. If a user turns on the hypertension monitor, the system activates. The user must then wait for the device to detect their hypertension. Before being sent to email and WhatsApp, the results will first be presented in the Juice SSH program. A helpful Android software that makes it simple to operate Linux servers is called JuiceSSH.

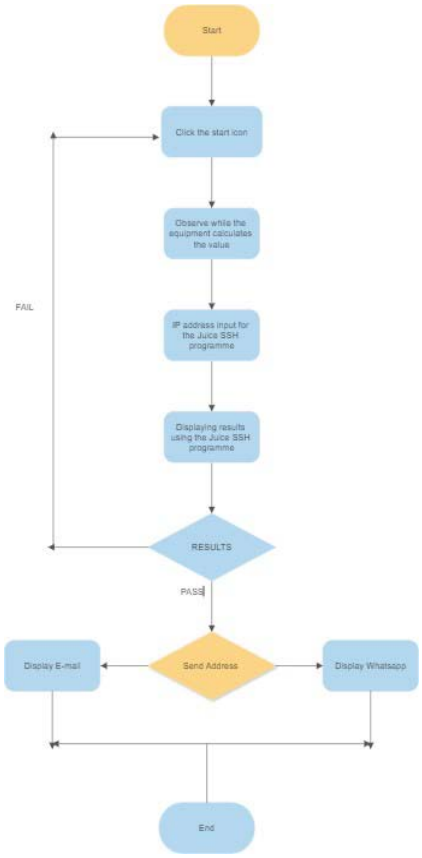


Fig 2: Flow Chart

### A. *Structure of the devices*

The information from the hypertension sensor is sent to a personal laptop using a Universal Serial Cable to TTL Wired connection. In this project, there are two ways to access the internet: using an Ethernet connection and a wireless adaptor. In this design, a Raspberry Pi model B+V1.2 with 40 General-Purpose Information pins is used. Linking the USB cord to the PC will provide the Raspberry Pi with the 5 volts it needs to turn on. The wrist-mounted hypertension tracker utilised in the experiment has the product code CK101. Using a USB to the Universal Asynchronous Receiver Transmitter cable, the hypertension information from Electrically Programmable ROM will be sent to the PC. Figure 3 shows the hypertension device used in this experiment.


Fig 3: Hypertension Device

## III. Result and Discussion

The wrist-mounted hypertension tracker is linked to the Raspberry Pi with a USB wire. The WiFi dongle is then attached to the Raspberry Pi to provide internet access. The data must be transferred via a Bluetooth link in order to use the Networks.

### A. *Results on WhatsApp and email*

It depicts the Whatsapp application displays, while it shows a screen grab of an Email. Basically, the hypertension values, a description of the findings, and a date regarding when the information came were all presented on both devices. According to the American Heart Association (AHA), hypertension is deemed to be normal if it is less than 120 mmHg and high if it is around 120 and 129 mmHg. The remainder is classified as systolic, stage 1, or stage 2. Based on the data, a summary is generated by the software according to each person's systolic readings, regardless of whether they indicate a healthy, lower, or high hypertension measurement

### B. *Hypertension accuracy depends on user location*

When the data was collected, the user's hypertension was healthy. In the sitting posture, hypertension appears normal. In the standing position, hypertension appears more, and in the laying position, hypertension appears down. When the user is seated and holding the device properly, the readings are most accurate.

## IV. Conclusion

The establishment of an Internet of Things Hypertension tracking system utilizing a Raspberry Pi is discussed in this study. The system can read and transfer data to both the WhatsApp and Email applications, according to the results. The system has successfully undergone design and analysis. Future wireless connections between the Raspberry Pi andhypertensiontracker will allow for a more compact design. Additionally, the concept might be expanded to read additional medical devices like ECGs. Additionally, the system can combine many wireless technologies, including Wi-Fi, Multi-hop Wireless Systems, and Device-to-Device Connections.

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