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Smart Water Dispenser

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Abstract:- The rapid growth of the Internet of Things (IoT) changes humans life into a smart world. Physical objects connected with smart sensors provide data to make people's life easier. We present a case study of the smart water dispenser is with the aid of weight sensor, temperature sensor, and raspberry is built to assists the users and the water bottle suppliers by tracking the amount of water used in day to day activity. The smart water dispenser measures the weight of the available water in the dispenser and pops an alert when the water in the dispenser is about to finish. It measures the temperature and pushes notifications to the user about water consumption.

Keywords:- *Temperature Sensors, Intelligent Sensors, Blue-Tooth, Microcontrollers, Environmental Sensing, Internet of Things, Water Consumption, Water Dispenser.*

I. INTRODUCTION

The Internet of things or IoT refers to a system which is having interconnected devices including humans and animal, with unique identifiers, Which have the ability to transfer data without human interaction through a network.It is predicted to reach more than 50 billion devices by 2020. Smart homes, health care and transportation are few related systems. Environmental smart devices can work according to the contextual awareness that can not be achieved through manual monitoring [1] [2].

When we add sensors to smarts objects it will become smarter and will provide new more opportunities to improve the monitoring process. There are devices which can be attached to the human body as a wearable one and connect with the sensor network, that is aided with smart devices and smartwatches. If we consider the smartwatches available in the current market, most of them are connected with sensors to detect heart rate and temperature calculating sensors.

There are some health monitoring applications available that are connected with smartwatches which have notification facilities like receiving and sending messages. Sensors and smart devices made big data science as one of the trending technology. Records collected from sensors and smart devices facilitate data mining and new insights. Since the human body consists of 50-65% water, [3] water consumptions are really essentials for people. So in working place or any situation, there is a necessity to satisfy the demand of the water. The system which is proposed in this paper satisfy the requests of groups of people who have access to the water dispenser. It will avoid human effort in monitoring as well as avoid conflicts in the area.

Smart water dispenser enables specific users to receive alerts and reminders of when to refill the dispenser.As well as for all the users who have access to the specific floor will get the notification regarding the consumption of water according to the temperature.This paper presents the sensor-enabled smart water dispenser's initial results. We present the system architecture, methodologies and current system performance.

II. RESEARCH PROBLEM

Currently, in an organization, there are few water dispensers available on each floor. But there is no proper way to track the number of water bottles used per day or week. There is no finest solution to solve the issue in refilling the dispenser, according to the variation in the environment. The worker needs to monitor and refill the dispenser as well as manually updating the inventory. As well as Administrator needs to book water bottle manually from the vendor.

III. METHODOLOGY

A smart water dispenser integrated with two sensors along with the smartphone. One sensor for taking environmental temperature, that will analyze the temperature in the environment and then according to the read value from the sensor it generates a notification to the user how much water user needs to be consumed in that day. The second sensor is to measure weight. It will take the weight of the water bottle in the water dispenser. Even though there are few sensors available these days which we can attach inside the water bottle, we chose this weight measuring sensor, because users will reluctant to use water if the sensor is inside the water bottle by thinking about health issues come through an electronic device.

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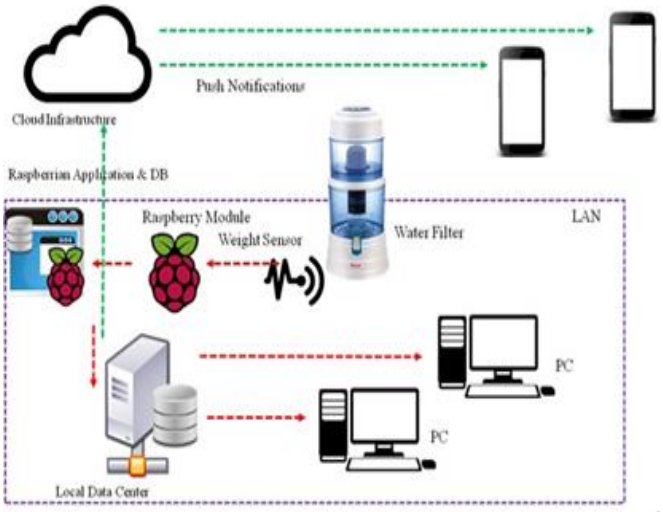

Fig 1:- System overview

The sensor communicates with the application for raspberries and the database. The application processes smart water bottle data from the raspberries application and send processed information to the server.

Then the data will be transferred to the local data center and to the cloud according to the type of the processed data. The data in the local server will notify the Administrator how much water consumption happened on that floor per week. If the available water bottles quantity is less than the given threshold values then the local sever will push a notification to the vendor.

The data in the cloud will send the notification to the worker when to refill the dispenser as well for other staffs in the floor area to consume water according to the temperature. The complete system overview is given in figure 01.

The DS18B20 communicates with the communication protocol "One - Wire," a proprietary serial communication protocol that transmits temperature readings to the microcontroller using only one wire.

In what is known as parasite power mode, the DS18B20 can be operated. The DS18B20 normally requires three wires to operate: Vcc wires, ground wires, and data wires. Only the ground and data lines are used in parasite mode, and power is provided through the data line.

Also, the DS18B20 has an alarm function which can be configured to deliver a signal when the temperature crosses a user - set a high or low threshold.

A64bit ROM will store the device's unique serial code. This 64-bit address allows a microcontroller to receive temperature data from an almost unlimited number of sensors at the same pin. The address tells the microcontroller where a particular temperature value comes from.

Connect the DS18B20 to the Raspberry Pi. There are three separate ground, data and Vcc pins in the DS18B20. Figure 3 shows the wiring diagram of how to send temperature data to SSH terminal.

Figure 4 and figure 5 shows the temperature read by the sensor in Celsius and Fahrenheit.

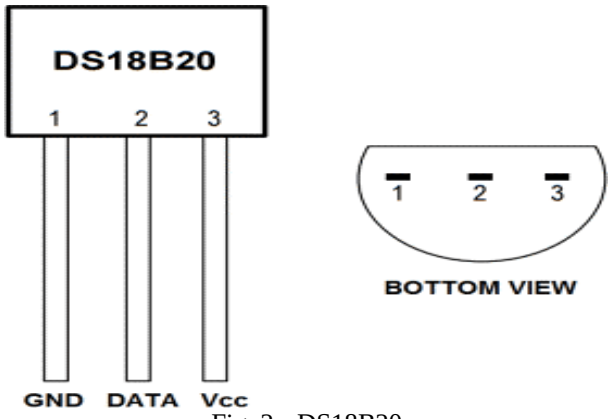

Fig 2:- DS18B20

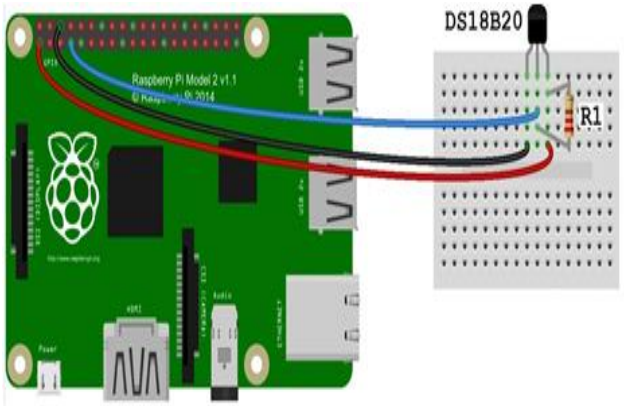

Fig 3:- Wiring Diagram

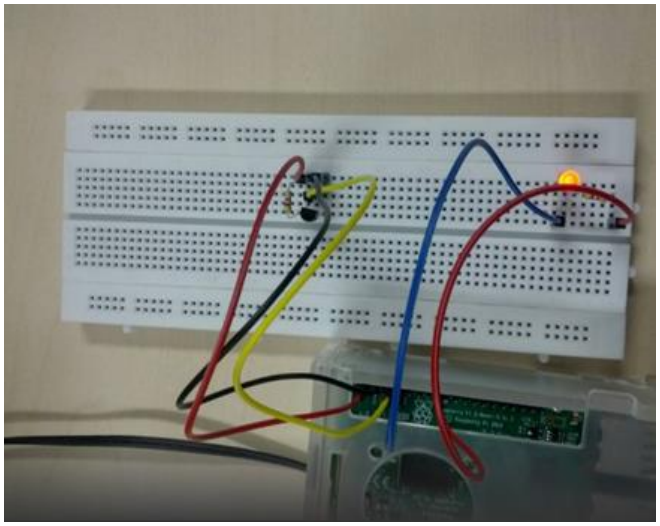
Fig 4:- Sensor Configuration

Table1 shows the temperature readings and relevant LED status.

The temperature of the Environment	LED Light ON /OFF
>= 26C	ON
< 26C	OFF

Table 1:-Temperature Readings Vs Led Status

Using the weight sensors the weight on the water dispenser (Weight of the water bottle) is measured. The weight measured by the weight sensor will be sent to the raspberry pi.

1Kg = 1L

Normally in the real world scenario, the water bottle we use for the water dispenser is 20L ones. So it measures approximately 20Kg. When the water level comes to 1l it means 1Kg we push notification to the person who is in the charge of changing the water bottle to the particular water dispenser.

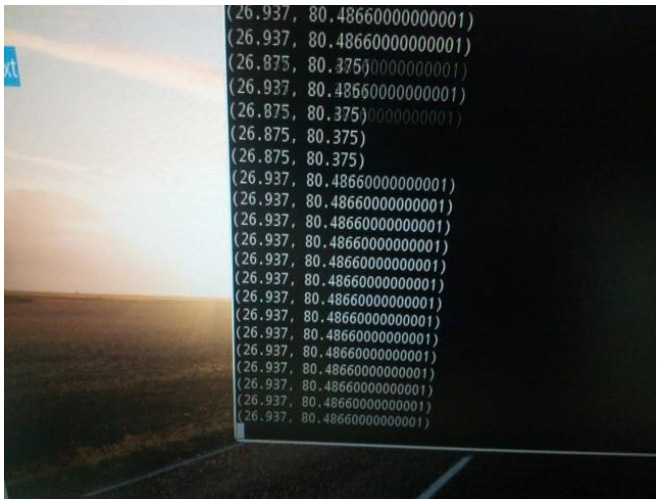

Fig 5:- Sensor Output

A load cell is a sensor or transducer that transforms into an electronic signal a load or force acting on it. This electronic signal may be a voltage change, current change or frequency change depending on the type of load cell and circuitry used. There are a lot of different load cell types. Both resistive load cells and capacitive load cells are available.

The used load cell is RSB2. There are only two inches in diameter and about one inch high and are excellent for measuring compression loads with very high accuracy and time and temperature stability. They have four threaded mounting holes on the base to make it easy to attach to your particular assembly. They are available in capacities of 25 kg, 50 kg, 100 kg, 250 kg, 500 kg and 1000 kg.

IV. RESULTS

Tests for this research were done in different locations in order to validate the correctness of the sensor reading.

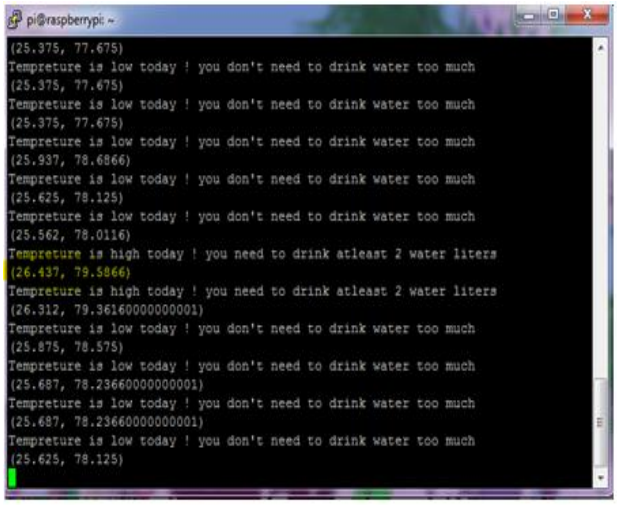

Fig 6:- Location X

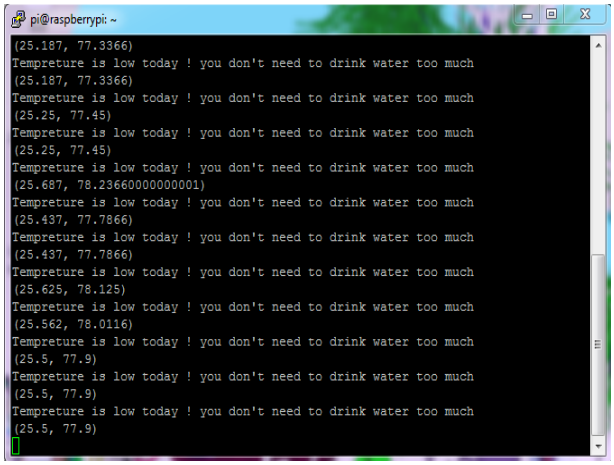

Fig 7:- Location Y

V. CONCLUSION AND FUTURE WORK

Increased intelligence of every day, sensor objects implemented in devices offers opportunities for new applications and services. Multisensory integration is a very promising approach for robust monitoring and understanding of the measurement context. A cloud-based solution allows seamless integration with a standard infrastructure for a large number of users but requires higher power consumption.

The smart water dispenser can be improved with a lot more facilities in the future. Particularly by attaching an RFID reader to the dispenser we can track the amount of water every person has consumed in the day.

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