

Safety Enhanced Location Tracking Device for Logistics Container using Raspberry PI

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Abstract- The Internet of Things (IoT) interconnects physical devices and objects that offer to enrich the user experience. For instance, empowering traditional transport systems with IoT ensures greater visibility Internet of Things (IoT) interconnects physical devices and objects that offer services to enrich the user experience. In traditional shipping and freight systems, containers carrying donated organs should be sealed carefully, kept below a certain temperature, and placed in a physically safe place to minimize the chances of damage due to jerking and accidental falling. During the shipping process, the IoT-enabled container provides continuous monitoring and readings related to temperature, humidity, location, vibration, and open/close conditions. Additionally, automatic push alerts and notifications are sent to stakeholders when certain conditions or violations occur.

Keywords- Text Here Your Keywords.

I. INTRODUCTION

Nowadays some 18 million containers are constantly crisscrossing the seven seas. These standardized receptacles have become the building blocks of the global village. Almost 90% of the world trade is done with the help of containers using different means of transportation including railways, air, trucks, and ships. In another reference, the number of containers moving across the globe is more than 100 million amounted. According to a case study by the Congressional budget office, US congress, the shutdown of the ports of Los Angeles and Long Beach would cost the US economy somewhere in the range of 455 million to 1050 million dollars per week.

Apart from a monetary loss at the state level, it will also affect a lot of individuals including people working in the ports, the exporters and importers of containers, the container owners, and many more. On a lower scale, individual containers may contain goods worth millions of dollars. On average, it takes a couple of months for the goods to be delivered by ship to other parts of the world. Let's assume that the goods get damaged while being loaded, so once these goods reach the destination, it would result in a problem for the producers and consumers both resulting in huge losses in monetary terms.

With the knowledge that the goods could have been damaged, the company could immediately react and send other goods on the way.

Closed-circuit television monitoring system has now become an indispensable device in today's society. Supermarkets, factories, hospitals, hotels, schools,

and companies are having their own CCTV system for 24/7 monitoring. Instead of using the traditional wireless CCTV surveillance.

II. PROPOSED WORK

We could implement the sensor technology in the long travel of the container, By this sensor technology, the parameter values are measured and if it detects any abnormal values in that container then the actions can be taken accordingly as a precaution.

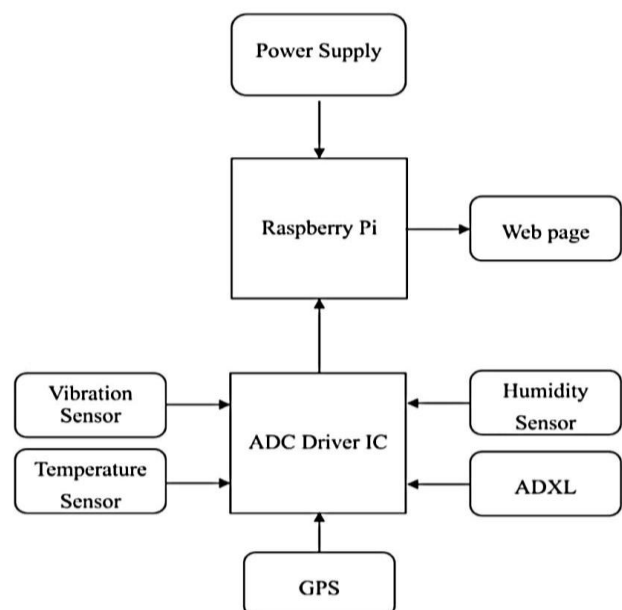


Fig 1. Block diagram.

We can place certain sensors in that container; the following sensors are the Temperature detection sensor, Vibration sensor, ADXL Gyro detection sensor, and Humidity sensor. For example, if there is any medicinal glass particle that needs to be placed with care without vibration and if it vibrates, then it will be detected in the vibration sensor.

The Humidity Sensor and the Temperature sensor are to help the product store in the specified atmospheric condition. For example, if there is any product that is in the content of keeping it in a cool place, is called humidity, and the heat detection sensor is used to prevent the fire if occurs. The Buzzer is to alert the persons also the web page is to monitor the people in the shipment area. Also, the GPS is enabled to detect the product's location and will be updated in the IoT value. If sent any product with an ID, by that ID it can be found easily where the product is and the values in the product's container can be monitored. And the major advantage in our proposed system can be prevented fire accident. Loss of products can be avoided. Products can be delivered safely without any damage. The relationship between shipping industries and customers can be built stronger.

III. SYSTEM DESCRIPTION

The proposed system is composed of hardware and software protocols.

1. Hardware Components:

1.1 Power Supply: All digital circuits work only with low DC voltage. A power supply unit is required to provide the appropriate voltage supply.

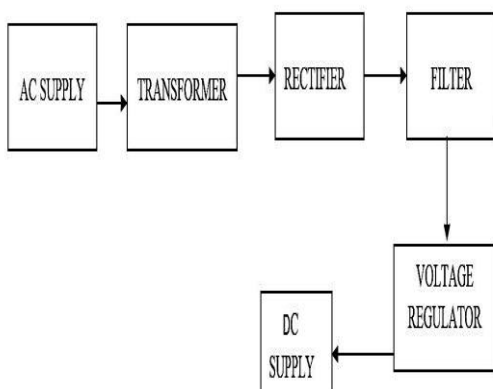


Fig 2. Block diagram of power supply.

1.2 Raspberry Pi 3: The Raspberry Pi 3 Model B is the third generation Raspberry Pi. This powerful credit-card sized-single-board computer can be used for many applications and supersedes the original Raspberry Pi Model B+ and Raspberry Pi 2 Model B. Whilst maintaining the popular board format the Raspberry Pi 3 Model B brings you a more powerful processor, 10x faster

than the first generation Raspberry Pi. Additionally, it adds wireless LAN & Bluetooth connectivity making it the ideal solution for powerful connected designs.

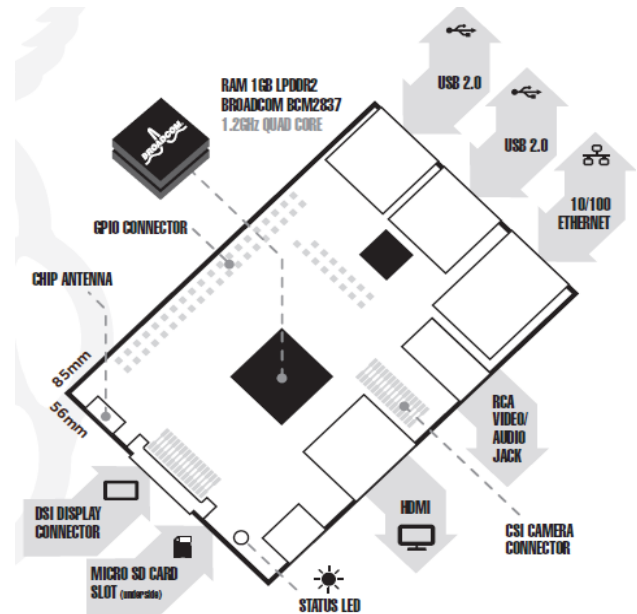


Fig 3. Block Diagram of LCD.

1.3 GSM: A GSM modem or GSM module is a hardware device that uses GSM mobile telephone technology to provide a data link to a remote network. From the view of the mobile phone network, they are essentially identical to an ordinary mobile phone, including the need for SIM to identify them to the network. GSM modems typically provide TTL-level serial interfaces to their host. They are usually used as part of an embedded system.

1.4 GPRS: GPRS is a best-effort service implying variable throughput and latency that depend on the number of other users sharing the service concurrently, as opposed to circuit switching, where a certain quality of service (QoS) is guaranteed during the connection.



Fig 4. GSM & GPRS.

In 2G systems, GPRS provides data rates of 56–114 kbit/sec. 2G cellular technology combined with GPRS

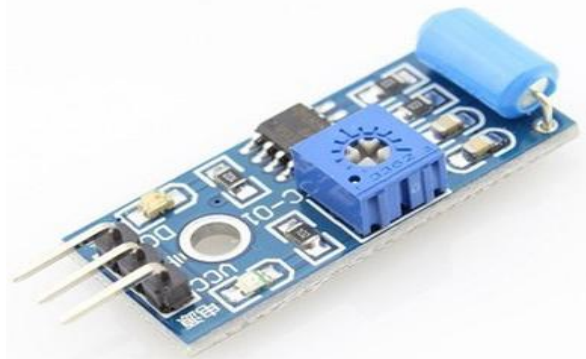


Fig 8. Image of Vibration Sensor.

2. Software Components:

2.1 VNC Viewer: VNC is a tool for accessing your Raspberry Pi graphical desktop remotely. Setting up VNC is really easy but it usually only gives you access from another computer that is on the same network as your Raspberry Pi. In this article, we will guide you through how to use PiTunnel to allow you to access a VNC remote desktop for your Raspberry Pi from anywhere in the world. We will do this by using the Custom Tunnels feature of Pi Tunnel. All your Raspberry Pi needs is an internet connection and Pi Tunnel will do the rest. You will need to install a VNC Viewer on your computer, so you can connect to your Raspberry Pi. There are a number of viewers available, but the easiest to set up is Real VNC Viewer.

2.2 Python IDE: Python is a general-purpose programming language, which is another way to say that it can be used for nearly everything. Most importantly, it is an interpreted language, which means that the written code is not actually translated to a computer-readable format at runtime. Whereas, most programming languages do this conversion before the program is even run. This type of language is also referred to as a "scripting language" because it was initially meant to be used for trivial projects. Python can also be used to process text, display numbers or images, solve scientific equations, and save data. In short, it is used behind the scenes to process a lot of elements you might need or encounter on your device(s) - mobile included.

2.3 Arduino IDE: The Arduino Uno has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). However, on Windows, a .inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer.

2.4 PIC C Compiler: CCS provides a method to attempt to make sure you can compile code written in older versions of CCS with minimal difficulty by altering the methodology to best match the desired version. Currently, there are 4 levels of compatibility provided: CCS V2.XXX, CCS V3.XXX, CCS V4.XXX and ANSI. Notice: This only affects the compiler methodology, it does not change any drivers, or libraries and include files that may have been available previous versions.

Automatic (Software)Reset Rather than requiring a physical press of the reset button before an upload, the Arduino Uno is designed in a way that allows it to be reset by software running on a connected computer. One of the hardware flow control lines (DTR) of the ATmega8U2/16U2 is connected to the reset line of the ATmega328 via a 100 nano farad capacitor. When this line is asserted (taken low), the reset line drops long enough to reset the chip. The Arduino software uses this capability to allow you to upload code by simply pressing the upload button in the Arduino environment.

This means that the bootloader can have a shorter timeout, as the lowering of DTR can be well-coordinated with the start of the upload. This setup has other implications. When the Uno is connected to either a computer running Mac OS X or Linux, it resets each time a connection is made to it from software (via USB). For the following half-second or so, the bootloader is running on the Uno. While it is programmed to ignore malformed data (i.e. anything besides an upload of new code), it will intercept the first few bytes of data sent to the board after a connection is opened.

If a sketch running on the board receives a one-time configuration or other data when it first starts, makes sure that the software with which it communicates waits for a second after opening the connection and before sending this data. The Uno contains a trace that can be cut to disable the auto-reset.

The pads on either side of the trace can be soldered together to re-enable it. It's labeled "RESET-EN". You may also be able to disable the auto-reset by connecting a 110-ohm resistor from 5V to the reset line; see this forum thread for details.

IV. CONCLUSIONS

The analysis carried out with a controller allowed reducing the dimensionality of a set of data, which suggested excellent repeatability, and later the possible application of this sensor for the detection and monitoring of container safety present in sea cargo containers were analyzed by various sensing data (For e.g. if there any medicinal glass particle that needs to be placed with care without vibration and if it).

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