

IoT- Enabled Safety and Security for Transportation of Human Organs with Location Tracking

Dr. Shubhangi D.C¹, Sharanabasappa Patil²

¹Professor and Program Coordinator, Department of VLSI Design and Embedded Systems, VTU CPGS, Regional Office, Kalaburagi

²Department of VLSI Design and Embedded Systems, VTU CPGS, Regional Office, Kalaburagi

Abstract - In these contemporary days of Internet of Things is bringing a graphical adjustments within a computation of people who can still richly use and negotiate the internet that has been furnished with eager to offer a result that is self envisioned via interconnection of IOT to the bodily items. For instance IOT can empower transportation of shipment remotely through more distances. In modern-day days shipment it's far important that every organ and items that has been carried is to be sealed carefully and has to be preserved carefully within the container with the control of temperature inside it, the shipment company has to ensure the transportation needs to be finished cautiously without any disturbances internal it.

Keywords: - Internet of Things (IoT), formaldehyde gas sensor, DHT11 sensor, GPS module, Blynk mobile application.

1. INTRODUCTION

The IOT based container [1] is a shipment based project. The idea behind this project is in the olden days, if any person who wants to ship any organization items with the assist of shipment process then the person sending that items cannot be certain whether or not that items reaches to the destination or not. But with the assist of this paper it guarantees the shipment process with safe and timely manner. This paper specifies how the organ is preserved inside a container with the help of sensors as shown in figure [1].

Delivery facility via shipment is closely large and board in the course of the sector. While excellent delivery facility for goods had been there, some of the employer/owner had been facing hassle like for transportation of any items/organ donation and so forth. So modern people are glad to discover a container they were able to donate organ for some other person however required a timely manner. So deal with it our assignment specializes in how to deliver organ with the help of sensors and additionally you'll be able to reveal the place in order that it is able to attain to the needy man or woman with safe and cozy and in time, although there's any mismatch regarding shipment or transport tunnel the agency who's tracking that container can alert the opposite person simply by means of sending notification and so.. Therefore there is continuous monitoring for the container [1], also the shipment company has to be alert and send notification to the stakeholders that the container is safe and can guarantee state of the system to the stakeholder this is available with the help of Global positioning system [3.1]. For this the container should be always connected to the internet.

The major advantage of this proposed project is safety and security for this container is enriched for any biomedical organs are safe. Some of it requires minimum temperature [3.3] for shipment of longer durations from one country origin to another. The shipment person can track the location of the container by using GPS [3.1].

2. RELATED WORK

In [2] A. Zobel, et al has completely worked on the monitoring system of the temperature with careful attention of 24 hours of daily working on it, if there is any problem regarding this there will be with back-up generators and additional refrigeration systems.

M.C. Conner, et al [8] has suggested the temperature may vary as it is based on the internet and also explained the fluctuations in the temperature also depend on the IOT.

V.Clerc, et al [7] Blue clover format LLC", used smart and cozy field shipment presents fee to the safety of merchandise. The introduction and improvement in online shopping for has made it critical for the customers to understand approximately their shipment information. The crucial reason for the improvement of smart packing containers is to gain a better degree of efficiency and occasional strength consumption. The use of the tasks in this area has in particular targeted on detecting unexpected field openings, monitoring delivery situations, and inspecting storage problems.

In [4] A. Tims, et al has worked continuously that how a designed system can fail to deliver the products if the package of that product is not addressed properly, and the sensors that are used are specially used for transporting the organs/goods by placing the sensors inside the shipment container to track the location for security and safety.

3. PROPOSED ALGORITHM

In this mission methodology version takes the some important procedure and activities of mission plan, Analysis, Design, development, validation and evolution and represents them as separate system phases. In the maximum fundamental scenario for the field transport enterprise, IOT refers to the concept of connecting sensors and different digital devices [3] set up at the bins to the internet and/or local structures. This is wiped out order to send and receive statistics to and from these gadgets for numerous supply chain functions and packages. Until now the shortage of interoperability between different IOT solutions has made it in reality not possible to deliver this record at some stage in the container adventure. The smart container solutions will provide customers and carrier’s operational teams worldwide with relevant information on container status both shipment and shipping both on sea and land.

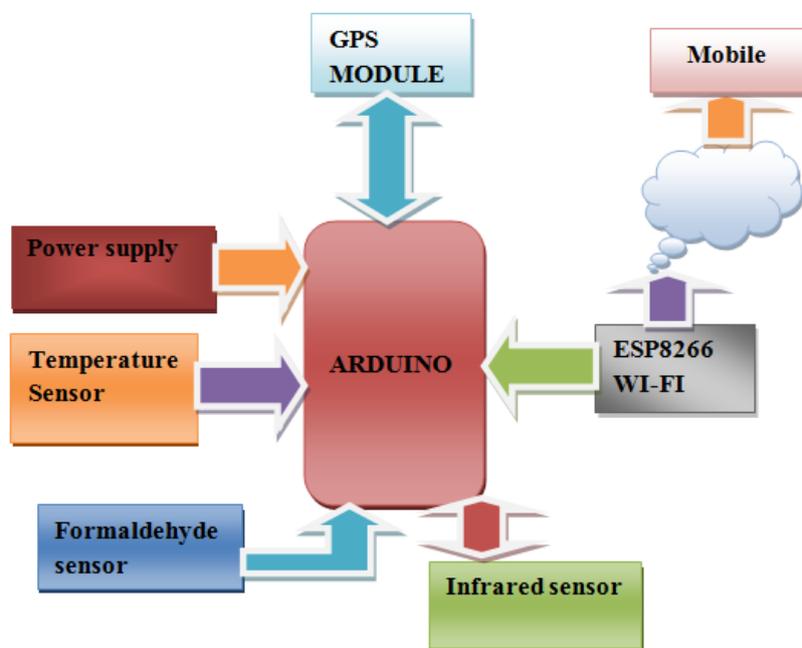


Fig 1: Block Diagram

3.1. GPS module

It is a global satellite system device shaped, used to indicate the correct location of a device to remember a point in meters. In our project GPS is made available for the sake of tracking the shipment of medical organs/goods within the container, so there is no problem when there is hazardous condition can manage the shipment process with the help of Global Positioning System. In reality, with higher level of GPS may take calculations to form better results. To determine the role of the GPS location types of standards are required, by way with the aid of GPS receiver. This data is continuously transmitted by means of way by the GPS satellites and your GPS receiver collects and shops this data.

3.2. Formaldehyde gas sensor

It is a tool for detecting the attention of gas in an ecosystem. Depending on gas sensing, a sensor generates a nearest capacity amount by changing the resistance of that fabric in the sensor, and this resistance is measured as the output voltage. The sort of gasoline that the sensor ought to locate relies upon the sensing fabric. Normally these sorts of sensors are available as modules with comparators that can be set for a specific threshold value of fuel interest. When the concentration of the gasoline exceeds the threshold, virtual pin goes excessive and the analog pin may be used to measure the awareness of the fuel. In our undertaking project Formaldehyde gasoline sensor is used to discover the presence of organ that is inside the field is having any odor/decaying then the gas presence suggests the organ needs to be introduced rapid to the corporation merchant.

3.3. DHT11 sensor

In this task we use dht11 as temperature sensor to hit upon any presence of organ/suitable vaccines that may be saved inside a container and might set a temperature that lasts long until the organ is reached to the other person without any harm. The temperature sensor used here is to monitor the presence of organ.

3.4. Blynk mobile application

Blynk is specifically used for mini projects by using iot. Manipulation of hardware can be done wisely, it is able to show sensor records, it may use records, visualize it and do many different cool things. The Blynk library provides support for all hardware systems and provides barriers to incoming and outgoing instructions. When we pinch a slider in this application, the sentence that we press is sent to the Blynk cloud. Blynk is specifically used as heart for this project as all notifications and alerts that can be seen in the mobile.

3.5. Working mechanism

This part gives an idea of how to implement a layout, and implementation information of the smart container machine. The smart container encompasses the surprising vibrations, and alerts that the container may subject to variations. It tracks the field's integrity to ensure that the lid of the container should not be opened except it reaches its vacation spot. Moreover it keeps the exact location of the contemporary device using a GPS locator. The data is sent to a cloud based on the router through Blynk app, in this data is processed and store. Then, data is displayed for customers by usage of alerts and notifications for application user of the Blynk carrier. Since this data is helpful for receivers then it processes this sent data and then sends it to the suitable table in the Blynk app. In this designed gadget a totally functional hardware and software program architecture design, implementation and operating of a clever container for shipment of biomedical organs [1] has been offered. The machine can be accessed via a dashboard (thru cell devices/internet browsers) for actual time monitoring of shipment bins. The proposed device works based on sensory information of shipment containers with the general cloud-based totally system that mechanically push indicators and notifies to the group member/companion while there is any distributions in the container.

From the below figure 2 shows the workflow of ARDUINO code. Initially all the data of sensors has to be read and stored in Blynk app it shows alerts when there is no proper working of sensors in the Blynk, the shipment agent can detect it and stop immediately.

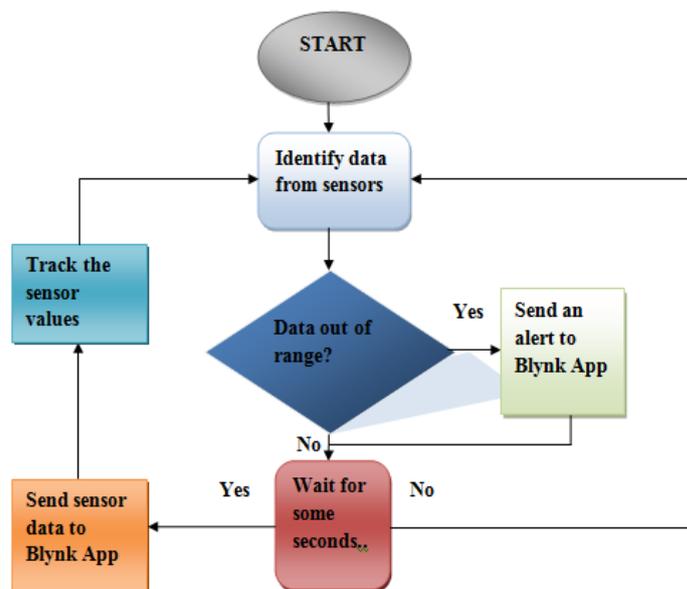


Fig 2: Flow Chart Showing ARDUINO Code

4. EXPERIMENT AND RESULT

This project is designed of how any Biomedical organ that can be shipped from one destination to another with security and safety.this also helps in applications like shipment of any goods and more.The experimental set up of the project is as follows



Fig 3: snap shot showing LCD set-up display



Fig 4: Snap shot showing vibration detection alert



Fig 5: Snap shot showing overview of the container

The shipment carrying container consists of sensors each of these sensors are connected and integrated to the Arduino board. Firstly we connect Hotspot to the Blynk app and then it shows you are online and then all the sensors which we have integrated to Arduino sends it to ESP8266 WI-FI module through server and lastly to Blynk app.

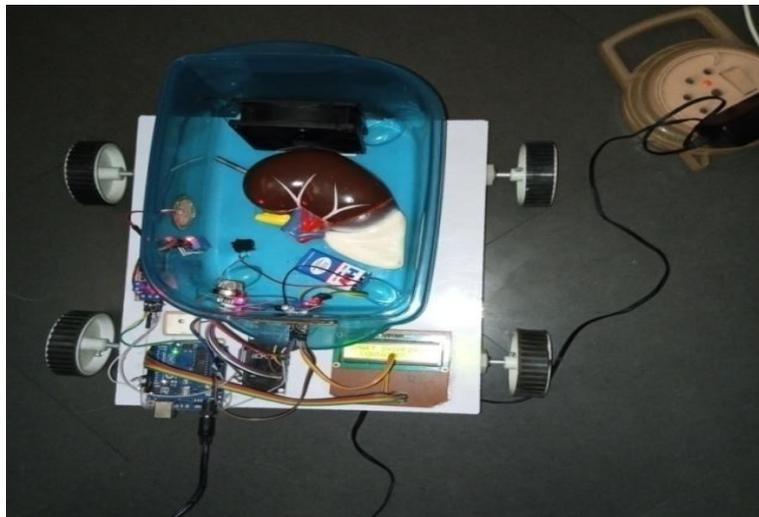


Fig 6: Snap shot showing container carrying an organ

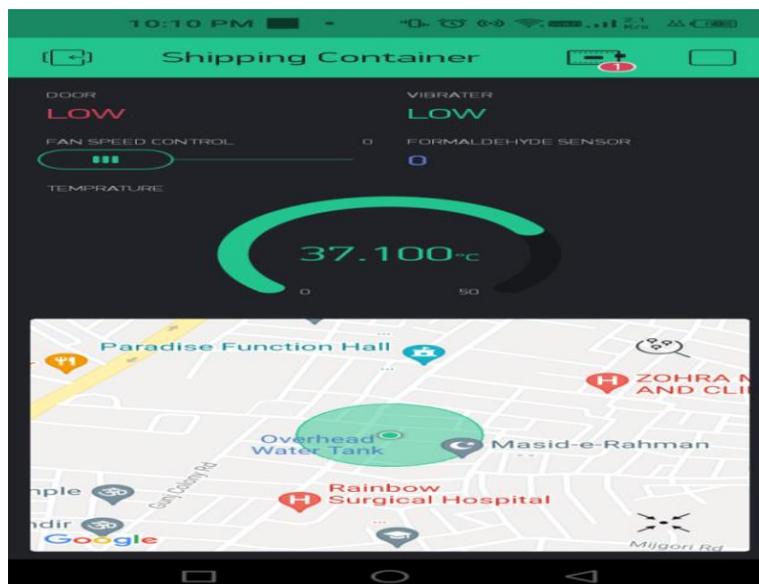


Fig 7: Snap shot showing Blynk application detection in mobile phone

The above snap shot shows how the Shipment of this container can be controlled and can track the shipment with the help of location called GPS(Global positioning system).This is accessed only by manager of that company or the person who wants to transport any organ.If any disturbances in the container will be detected by vibration sensor that shows the condition in the Blynk app as HIGH or LOW.

5. CONCLUSION

In this, the proposed system is used for safety and security of the shipment which is fully based on the technology implementation of the container by which the shipment carries the container which is controlled by the manager by using Blynk app as a mobile application [E] which sends any notification if there is any insecurity related to the container. IOT enabled shipment field with biomedical organ for location tracking is a whole lot essential, as our shipment that incorporates any organs that doesn't make sure safety and protection, if there is any hazardous situation even as shipment of those organ the shipment organization has to force stop for a while, wait till the surroundings is clear and ready to supply that organ for any other organization/person it takes a long term, if the person doesnt get it and has to die indeed has to sacrifice his/her existence. The intention behind this project is to make sure the human organ [6] the container is carrying has to be safe and with high security around it.

REFERENCES

1. W. S. Council, 'Trade Statistics', 2019. [Online].Available: <http://industry/global-trade-statistics>. [Accessed: 7-July-2019].
2. A. Zobel, 'Cold Chain Logistics', 2016 [online]. Available: <https://www.parexel.com>. [Accessed: 7-July-2019].
3. M. L. Hertlog, I. Uysal, U. McCarthy, B. M. Verlinden, and B. M. Nicolai, "Shelf life modelling for first-expired-first-out warehouse management", *Philosophical Transactions of the Royal Society*, Vol. 372, no. 20130306, 2017.
4. Tims, 'When courier companies fail to deliver', 2014.[Online]. Available: <https://www.theguardian.com/money/2014/apr/07/courier-yodel-hermes-delivery-fail-complaints-budget>. [Accessed: 17-Jan- 2019].
5. M.Hulsmann and v.Brenner, causes and effects of cold chain ruptures: performance of fragmented versus integrated cold chains.Bremen: Jacobs university, 2011.
- 6.J.Parfitt,M.Barthel,and s.Macnaughton,"Food waste within food supply chains:quantification and potential for change to 2050.,*Philosophical transactions of the royal society B:Biological sciences*,Vol.365,no.1554,pp.3065-3081,2010.
7. V.Clerc," Blue clover format LLC", used smart and cozy field shipment presents fee to the safety of merchandise.
8. M.C. O'Connor," cold-chain project reveals Temperature inconsistencies, 2015.