Exim Traffic Map For Live Logistic Congestion Indicator & Logistic Planning Tool

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Abstract- *Almost 90% of the world trade is accomplished with the help of containers using different means of transportation. Due to process attribute and complication, container trade faces a lot of challenges during day-to-day production. Container tracking, real time monitoring and intrusion detection, and real time theft reporting mechanism as well as status reporting of shipment items the container monitoring system seems to be the one of the most important tools for intermodal transport managers. Nowadays container will help us lot to perform the transportation across the world. Large amount of goods are get transported through containers of the train, air etc. So sometimes it is critical to identify the delay in delivery of the container. There is not any kind of strong system available which will populate the traffic of train across the route and determine the delay taken by train while traveling. So for that a proposed system is introduced which will help the administrator to check out the delivery of the container in time or out of time.*

Keywords- Internet of things, Raspberry PI-3B,GPS Module,DHT 11 sensor,HX711 sensor.

I. INTRODUCTION

IoT (Internet of things) may contribute to addressing many of our global challenges, such as disease outbreaks, climate change, pollution, resource scarcity and it may impact our own life routine, such as home management and appliance maintenance. In terms of the application of IoT to the industrial world, helps in “preventive maintenance, remote control, manufacturing diagnostic tools and services, management of process quality as well as smart retrofitting of machinery, which will allow to integrate whole supply chains, tracking and tracing inter and intra plant logistics. In addition, the advances in IoT may help to “monitor and visualize various wireless sensor networks (WSN) applications in manufacturing environments such as automated work-cells, transportation systems, logistic, and storage systems”. In this context, real-time data and delivery of the product in the right place at the right time are streamlined, even allowing the creation of new services and the improvement of business processes and business models. Globally over millions maritime containers are in transit throughout the logistic processes on any given day, in spite of time and weather condition - at sea, on rail, over the road, or waiting for pick-up, delivery and stripping. From economical point of view misplaced container results in financial and operational risk which may lead to delivery with increased transaction costs, production disruptions, missed sales opportunity and finally higher costs of goods being. According to Peters (2001) the syndrome of the "Needle-in-a-haystack" appears additionally in logistic processes of handling millions of container trips yearly around the world, in which only a small percentage of handled containers is inspected. It causes an additional challenge to secure the supply chain without stopping the flow of world commerce. The goods monitoring and tracking solution has to assist the flow accurately with timely information across all involved parties including supply chain partners and government agencies. Identification of possible economic profit, under the condition that demand for maritime transport must fulfill the entire process in order to obey a certain port calling rule, which aims at minimizing the total cost of the ship route system with multiple hub ports, multiple feeders and multiple port/terminal operations. Finally, as an effect of additional in field research, a numerical example might be provided to illustrate the effectiveness of the identified solutions, and the impact on the total cost in a complex transportation system might be deeply examine.

II. LITERATURE SURVEY

Logistics literature lacks a comprehensive consideration of the diverse IC measures, and it is unclear which area of IC requires more focus and development. Therefore, to explore and identify an opportunity for improvement, this study reviews the academic literature related to IC measures in logistics management. This literature review considers 111 academic articles published between 1994 and 2016. Following the six dimensions of the IC-Index, all indicators obtained from the literature are classified according to IC elements. The key contribution of this review is that it addresses the following gaps in the literature: the limited adoption of comprehensive IC methods in logistics studies; under development of specific indicators and measures used; failure to consider all human capital as well as renewal and development elements; and, academic research

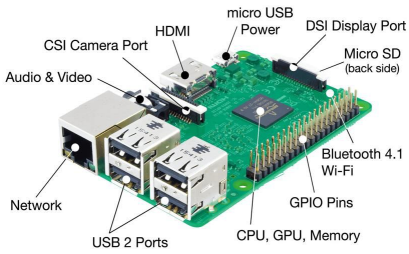
considering the influences among the different IC elements and logistics and financial performance logistics and financial performance.

III. SYSTEM ARCHITECTURE

The Logistic mapping tool system was produced utilizing Android Studio throughout exploration and now a User Interfaced (UI) Android Application program actualized on an Android based GPS empowered cellular telephone, and a raspberrypi3 kit, which can interact with various sensors and accordingly provide live information for the logistic. The framework depends on the raspberrypi3 kit signal information transmission utilizing Internet (GPS) correspondence as a part of request to encourage the logistic control in a mapping tool. This framework guarantees a secured trade of information on remote correspondence. It additionally underpins customary ON/OFF arrangement of logistic via different sensors. A client interface (UI) on the Android empowered cellular telephone offers framework association. The Live-update operated Android and RaspberryPi3 kit uses an Android based Internet enabled phone for its application and the RaspberryPi3 kit as the microcontroller. The key components of this system are Android based phone, Internet module (GPS), RaspberryPi3 kit and sensors like Dht11, IR, Load cell.

3.1 Raspberry Pi 3:

The Raspberry Pi 3 Model B features a quad-core 64-bit ARM Cortex A53 clocked at 1.2 GHz. This puts the Pi 3 roughly 50% faster than the Pi 2. Compared to the Pi 2, the RAM remains the same – 1GB of LPDDR2-900 SDRAM, and the graphics capabilities, provided by the Video Core IV GPU, are the same as they ever were. As the leaked FCC docs will tell you, the Pi 3 now includes on-board 802.11n Wi-Fi and Bluetooth 4.0. Wi-Fi, wireless keyboards, and wireless mice now work out of the box. The headlining feature of the Pi 3 is the built-in WiFi and Bluetooth, the complete specs for the Pi 3:SoC: Broadcom BCM2837 (roughly 50% faster than the Pi 2);CPU: 1.2 GHZ quad-core ARM Cortex A53 (ARMv8 Instruction Set);GPU: Broadcom Video Core IV @ 400 MHz; Memory: 1 GB LPDDR2-900 SDRAM;USB ports: 4;Network: 10/100 MBPS Ethernet, 802.11n Wireless LAN, Bluetooth 4.0,CSI camera port for connecting the Raspberry Pi camera, DSI display port for connecting the Raspberry Pi touch screen display, Micro SD port for loading your operating system and storing data, Micro USB



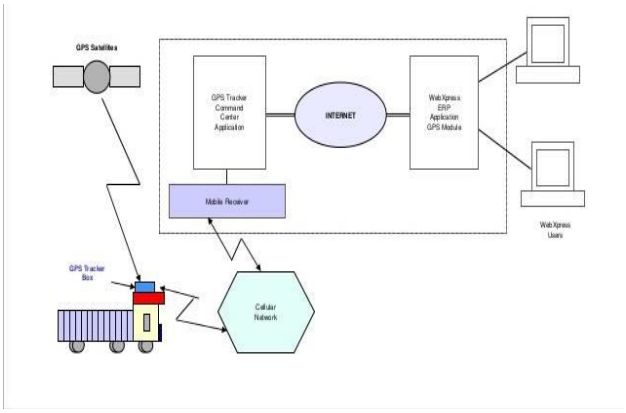
3.2 GPS Module:

GPS stands for Global Positioning System and used to detect the Latitude and Longitude of any location on the Earth, with exact UTC time (Universal Time coordinated). GPS module is the main component in our vehicle racking system project. This device receives the coordinates from the satellite for each and every second, with time and date.

GPS module sends the data related to tracking position in real time, and it sends so many data in NMEA format (see the screenshot below). NMEA format consist several sentences, in which we only need one sentence. This sentence starts from $GPGGA and contains the coordinates, time and other useful information. This GPGGA is referred to Global Positioning System Fix Data.

- **Importance of GPS in Logistic Mapping:**

In the transportation and logistics business, GPS or GPS technology today extends further than just a tool to help drivers to navigate from locations. With the advancement in mobile technology and mobile apps for logistics mobility solutions, GPS technology has fully transformed the transportation industry. A good GPS container tracking device can also record the opening and closing of the container door making it easier to identify when someone accessed goods within the container itself.



In this case a door or movement switch is wired into the GPS tracking device to allow it to know when someone enters the container. It also helps in cost assessment, excellent customer service and improve efficiency. Also provide features like:

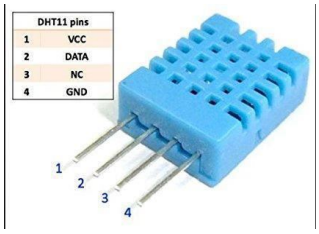
• Fleet management
• Resource optimization
• Driver safety & performance
• Unmatched efficiency
• Reduce administrative resources
• Cost analysis/assessment

3.3 Android Based Phone

Android is a mobile operating system (OS) based on the Linux kernel and currently developed by Google. With a user interface based on direct manipulation, the OS uses touch inputs that loosely correspond to real-world actions, like swiping, tapping, pinching, and reverse pinching to manipulate onscreen objects, and a virtual keyboard. We have used the Android platform because of its huge market globally and easy to use user interface.

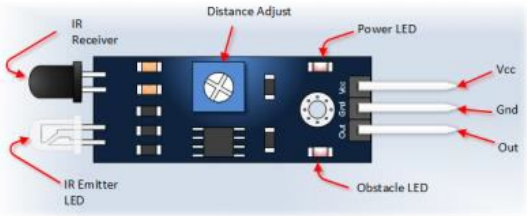
3.4 DHT11

The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermostat to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). It is fairly simple to use, but requires careful timing to grab data.



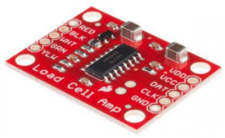
3.5 IR Sensor

IR (INFRA-RED) sensor is based on LM 358 IC which is an Operational amplifier acting as a comparator. The comparator compares the analog voltages of potentiometer and the voltage generated by the photodiode.IR Sensors are also used in Contactless Digital Tachometers. Some of the other applications where IR Sensors are implemented are Line Follower Robots, Obstacle Avoiding Robots, Edge Avoiding Robots and many more. The two voltages are applied on the two terminals of the IC and correspondingly it generates a digital output on the output pin that is indicated by a Red Led.



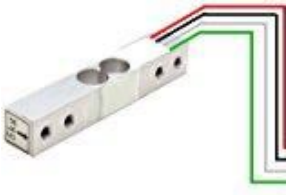
3.6 HX711

HX711 is a precision 24-bit analog to-digital converter (ADC) designed for weigh scales and industrial control applications to interface directly with a bridge sensor. The input multiplexer selects either Channel A or B differential input to the low-noise programmable gain amplifier (PGA). Channel A can be programmed with a gain of 128 or 64, corresponding to a full-scale differential input voltage of ±20mV or ±40mV respectively, when a 5V supply is connected to AVDD analog power supply pin. Channel B has a fixed gain of 32.



3.7 Load Cell:

Load cell is a transducer that is used to create an electrical signal whose magnitude is directly proportional to the force being measured. The various load cell types include hydraulic, pneumatic, and strain gauge. A load cell usually consists of four strain gauges in a Wheatstone bridge configuration. Load cells of one strain gauge (quarter bridge) or two strain gauges (half bridge) are also available. The electrical signal output is typically in the order of a few mill volts (mV) and requires amplification by an instrumentation amplifier before it can be used. The output of the transducer can be scaled to calculate the force applied to the transducer.



IV. SYSTEM DESIGN

The Logistic mapping system uses an Android based GSP enabled phone for its application and the Raspberry Pi3 kit as the microcontroller. A server is a computer program or a device that provides functionality for other programs or devices, called "clients". This architecture is called the client–server model, and a single overall computation is distributed across multiple processes or devices. PHP act as a Web Service for the Android application and server which works with database to extract and process data. Database is the: structured set of data which can be accessed in various ways. Using MySql queries are fired

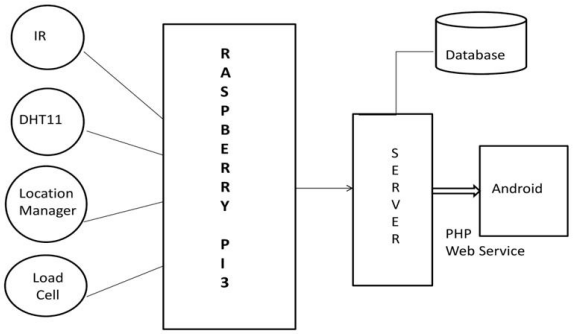


Fig 4.1: Block Diagram

4.2 Use Case Diagram:

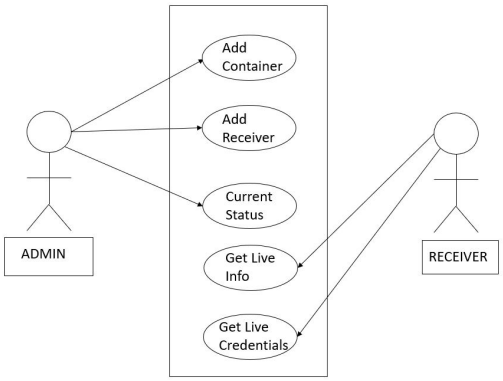


Fig 4.2 Use Case Diagram

- **Admin:**

Admin is a kind of user who has special rights, for example Add/Remove Device and Add/Remove Remote System, other than basic operations.

- **Receiver:**

Receiver refers to the person who has an account and a password, can log in on Android Application.

4.3 Project Flow:

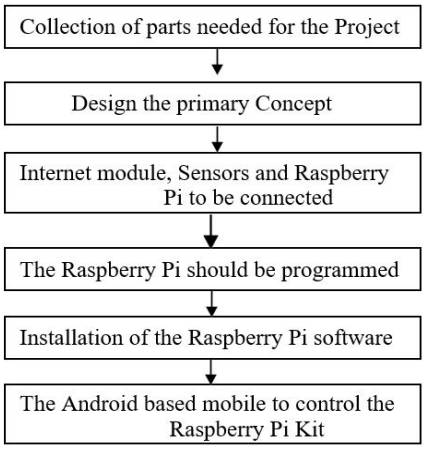


Figure 4.3 : Project flow

First, all the parts needed to design the project are collected and a primary concept is designed based on it. Next is the connection between the Raspberry Pi, Internet module, Sensors to be connected which are the most important part of the project. After all the connection is being done, the Raspberry Pi board needs to be programmed and the Raspberry Pi software has to be installed. At the end, the Android based mobile phone is used to control the Raspberry Pi

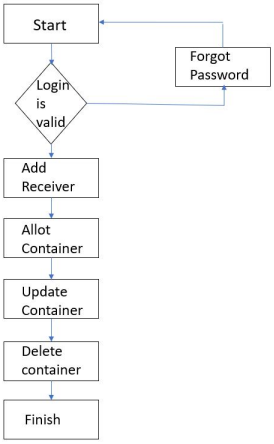


Fig 4.4 Admin Flowchart

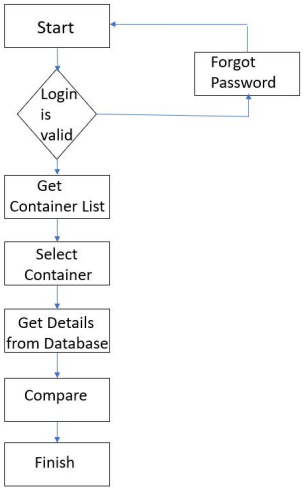


Fig 4.5: Receiver Flowchart

This is the flowchart representing user login. This login dashboard includes user id and password. This validation is checked, if it is valid it leads to the next dashboard if the user forgets the password then user can redeem the password using the forget password. The user gets the container list, appropriate container is selected and the container details appears on the screen which is extracted from the database. Thedetails are compared with their requirements.

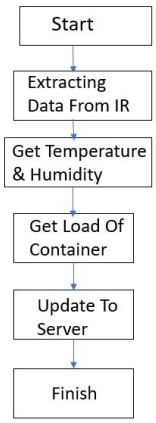


Fig 4.6: Hardware Module Flowchart

This is the overall flowchart of the system representing the condition of the container which are obtained from different sensors. The door condition is checked from extracting data from IR sensor ,the temperature and humidity is checked using DHT11 sensor further the load of the container is evaluated using HX711 and Load cell .The updated data obtained from the sensor is given to the server thus we get the Live Info from the server through android application using GPS.

V. CONCLUSION

Learning more about the various tasks and challenges of logistics, especially about transport, finance, and supplies has been a great help in understanding of what a logistician does. The current project presented the implementation of an inexpensive Exim Traffic Mapping, within the framework of Internet of Things (IoT). The system implementation is based on the Raspberry Pi microcontroller, which has been programmed to build a chain between the Admin, consigner and consignee; based on different sensor signals and on direct updations by the container's position. The model is made on a single platform with all these benefits, so is very useful in logistic planning and congestion indicating. The implementation of this project overall is successful. The motive of making cost efficient and user friendly system is taken into account and achieved. The project is comprised of components such as Internet, a Raspberry Pi board, Android mobile devices, IR sensor, Load measuring sensor, DHT11 sensor, and Android application. The model can be implemented with any logistic system. Furthermore, with the discussions and objectives presented, it can be concluded that the objectives of the project have been achieved. Taking into consideration the target audience of logistic consigner and consignee, the project developed is user friendly. Using an Android mobile phone, a proper logistic planning and controlling system is created using a smart phone

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