

Development of Vehicle Tracking System by Using Internet of Thing (IoT)

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Abstract

The vehicle tracking system is a technology that many businesses and people use to track a car using multiple methods such as GPS that works using satellites and ground-based stations or using our strategy that relies on mobile cellular towers. I'm providing a project with this fresh technology to resolve the issue in the courier business. It is a solution for fleet management and complete safety, it is used to determine the location of truck parcels by using distinct techniques such as GPS working via ground-based stations and satellites or by using cellular towers to obtain latitude and longitude to represent them on maps. The Internet of Things (IoT) can deliver adequate and good outcomes in our job by depending on a combination of software and hardware that is in the general interest of the project. The IoT can monitor the motion of the truck parcel and remain updated about the arriving parcel to the client. The goal of using IoT for tracking and monitoring is due to the excellent benefits it offers when working with its parts. In this document, we suggest a vehicle tracking system using NodeMcu linked to a Wi-Fi that used as a modem.

Keywords; NodeMCU, GPS, IOT Devices

I. INTRODUCTION

The GPS based vehicle tracking system is one that makes use of the Global Positioning System (GPS) to determine the exact place of the car to which it is connected. This project proposes IoT (Internet of Thing) enabled GPS based real time vehicle tracking system that tracks the vehicle and sends the tracking data to IoT platform. This system also can monitor a vehicle / car condition in traveling. This project is intended to educate about the place of the car. This surveillance scheme consists of a GPS receiver, NodeMcu, vibration sensor and Wi-Fi connection. This project more useful to the courier (Poslaju, Gedax, and so on) so customer and management team of Courier Company can track their parcel by using the data of the vehicle. When PosLaju want to send the parcel, they management team will be notify and management team also can update the location to customer. For this way, the courier don't

have to leave a notice to customer to take the parcel at the HQ anymore. It's also provide with vibration sensor to detect vibrate from the truck parcel if they having an accident during the delivery.

II. MATERIALS AND METHODS

A. Materials

The hardware needed to develop the project are; NodeMcu ESP8266, GPS Module NE0-6M, LCD I2C Module, and IoT Platform.

B. Block Diagram

Based on Figure 2.1, its show the process of this project. The system has base on board that is NodeMcu located between the transmitter and receiver. This system located in the vehicle to be tracked and the IoT cloud platform that monitor the location of the vehicle. A computer or mobile phone will continuously waits for system data and record

the actions of the vehicle. It contains the condition, position and temperature of the vehicle. For future, if accident occurs the management team will be inform and detect the location. It can be detect from the vibration sensor that implant at the prototype. NodeMcu as base station and server that connect to network internet. NodeMcu will be used to integrated and interfaced with GPS, Wi-Fi internet and IoT platform. GPS module used to navigate the location of truck parcel. Wi-Fi was used to send information to a cloud platform called Blynk and ThingSpeak where management team can access information real time location of the truck parcel. Advanced mobile phone is using by the client so as to send and get message with respect to current scope and longitude organize which allude to the current area of the transport. The client will be educated in regards to the current area of the transport by the yield message got that is show in scope what's more, longitude organize. With the assistance of Blynk Map, management can simply see the area of the transport in satellite symbolism

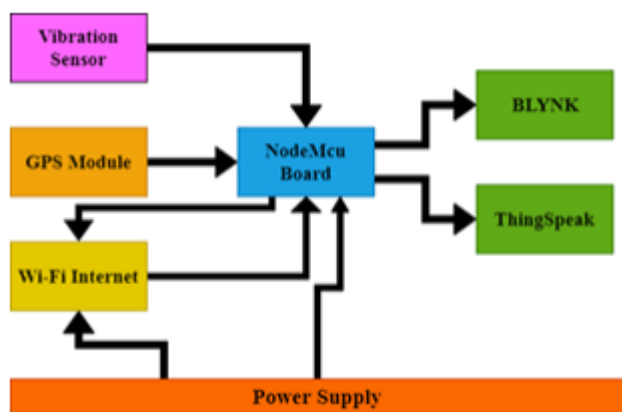


Figure 2.1: Project Block Diagram.

III. FLOWCHART

The figure shows flowchart of the project. It explain how the project will work and how the parcel can be tracked. The process starts when the truck is loaded with parcel and ready to be send to customer. It will activated the system. Once the system is activated, the LCD will display that system is connected to the NodeMcu. NodeMcu will be trigged and will be

connect to nearby internet. Then the GPS will relocate the location of the truck to be view on the IoT. If the GPS cannot be relocate the IoT display will show “GPS ERROR” and end the system. After the GPS is relocate, it will show latitude and longitude on IoT and data can be collected to be seen for the management team on the HQ. Real time location show on the Blynk apps for monitor the movement of truck parcel. After the NodeMcu processes the code from GPS, the GPS give the real time location of the truck at IoT platform through Blynk Maps. It will show the exact location of the truck. For the vibration sensor, it will trigger once the truck having strong impact or momentum when hit the car or obstacle. The value for vibration gauge will go until 1023 that mean the truck accident. Even if the vibration sensor is trigger without having any accident, the management team will call or confirm it with the driver if they having accident or just a small technical issue with the sensor.

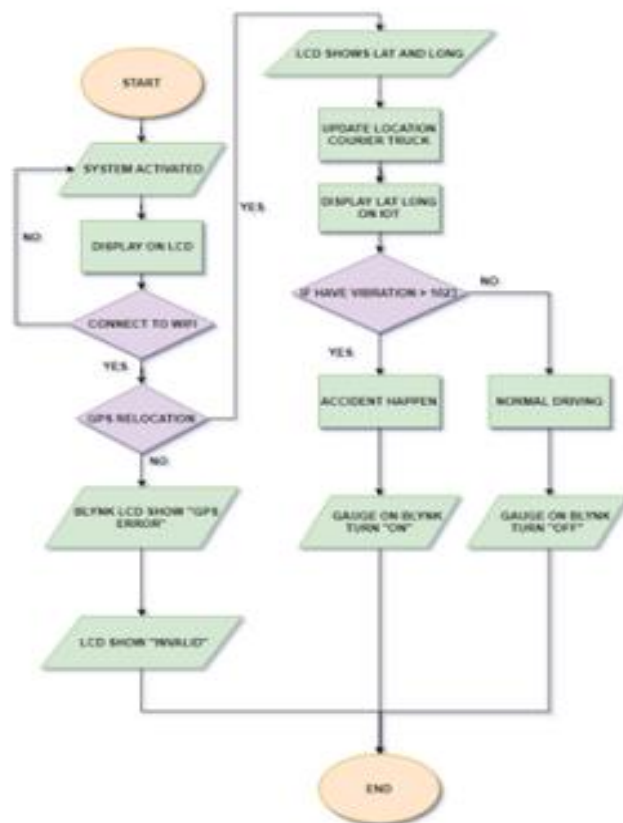


Figure 2.2: Project Flowchart

IV. CIRCUIT DIAGRAM

There are three main component that used in the project development which are NodeMcu ESP8266, GPS Module and Vibration Sensor (SW-420). In figure 2.3, the circuit shows the connection between the components to interface and run the circuit perfectly. The 3V3 pin NodeMcu Board is connected with the VCC pin of the GPS Module. It's where the components powered up with 3V power supply. For TX pin from the GPS Module act as the transmitter and connected with digital pin 6 known as DP6 while the RX pin is for the receiver of the GPS Module is connected to digital pin 7 also known as DP7. From the circuit, GPS Module can send outs its input data to NodeMcu and vice versa. In the LCD I2C module, the SDA pin is connected to digital pin 2 or DP2 of the NodeMcu from that the analog data from NodeMcu will transfer to LCD I2C. The other pin is SCL pin is connected to DP1 when the data were transfer this two pin is play important part for the LCD to display the word or number. For VCC pin it connected to Vin pin to give supply for the LCD and GND pin is connected to GND pin of the NodeMcu.

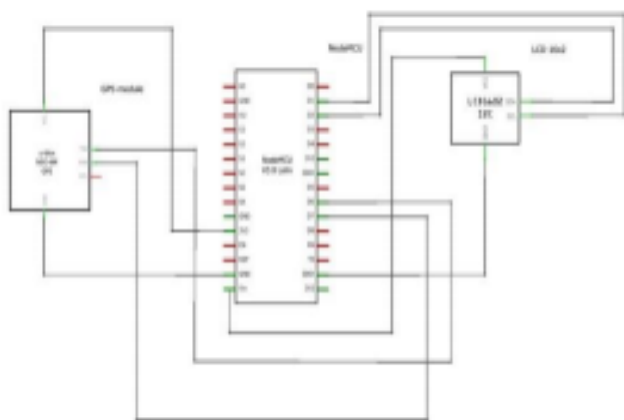


Figure 2.3: Circuit Diagram

V. RESULT

A. Blynk Apps Output

Blynk is a form of display for monitoring anykind of display that can be choose for user in this apps. The apps use to inform the location of the truck parcel in

real time location also display speed and direction of the truck parcel. User can used smart phone that already register with google account or Facebook account for register and use the apps directly by connecting with internet data or Wi-Fi. In order to track the truck parcel the system have to connect to internet without interruption because the GPS need an open space to be relocated the location. Once the GPS fully functional, the Blynks apps will display the longitude, latitude, speed and direction of the truck parcel. In advance, vibration sensor was installed with the system to detect if the truck parcel having an accident on the way deliver the parcel. The value was show in the figure 3.1 below.



Figure 3.1: Display on Blynk Apps when static (left) and moving (right)

B. ThingSpeak Output

User must have their very own channels to send or screen data. Making own channel is thoroughly free at this point. It is conceivable to screen the areas and different representations in the channel. Location update was a standout amongst the most prevalent highlights of Thingspeak. It is conceivable to send area data to the cloud in at regular intervals. By using this platform, management can keep update the location of the truck parcel because each truck have been set to go in the area that was set for them. If the truck were going the wrong way, management team can be notify, with that courier company can set a Key Performance Indicator (KPI) for every driver to make them sent the parcel on time and

safely. Every KPI target can show in graph data from the Thingspeak platform. Figure 3.3 show the graph data update of every two minutes.



Figure 3.3: Display in graph data ThingSpeak platform.

VI. DISCUSSION

This system work as perfectly as the vehicle tracking system by using IoT as well developed as appeared. The NodeMcu ESP8266 as the microcontroller goes about as the brain of the system. It is additionally go about as interface between the GPS module and Blynk and ThingspeakIoT platform that is used to got, control and process the info and yield information between the two devices. NodeMcu ESP8266 got every one of the information from the GPS beneficiary and extricated just scope and longitude arranges information. This procedure is direction to be consistently refreshed at consistently.

VII. CONCLUSION

This system successfully aimed its objective where the exact location of the truck parcel can be track and updated in Blynk apps and Thingspeak platform. The longitude and latitude will be shown on the platform. It will reduce the time delivery of the parcel because every second the location can be updated. It resulted to the truck parcel system where it can enhanced to be more effective and efficient so the customer can be updated on website every hour if the customer want to know the current location of truck. In this system, the method was implemented by using GPS module, LCD I2C and Vibration sensor technology that interface with

NodeMcuESP8266. The GPS system can track the truck in current position every second. The vibration sensor was used to detect vibrate if the truck parcel having a strong impact with that the management team can be notify if the truck having an accident. Therefore, it can eliminate the long time waiting of parcel arriving also it also can be beneficial to the courier

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