



Location Tracking with Node MCU without using GPS Module

Srinivash Raula | M.Chaitanya | B.Rasmitha | I.Laya Kishore | A.Mary Priyanka

Department of Electronics and Communication Engineering, Godavari Institute of Engineering and Technology(A), JNTUK, Kakinada.

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ABSTRACT

The need for location tracing is vast. GPS (Global Positioning System) is most widely used for location tracing. The Current method of tracing has some issues due to the accuracy of GPS receiver. A GPS receiver needs a clear view of sky to receive information from GPS satellites and weak signal will not provide desired results. Another problem is the size and power consumption. In addition to these issues GPS trackers produce data traffic which adds cost and consume further. This work is based on the geo location API and node MCU ESP 12E board to find the location without GPS module. We propose using serial monitor of Arduino IDE to see the coordinates.

Key words: GPS, geolocation API, Node MCU, location tracking

1.INTRODUCTION

Geolocation is the process of finding, determining and getting the exact location of a computer, networking device or equipment. It helps us to view the device location based on geographical coordinates measurements. Geolocation commonly uses Global Positioning System (GPS) and other related technologies to assess and specify geographical locations. It provides the location of a device but is generally used in variety of applications to help locate human users. Geolocation is a technology that works through a pre-built GPS in a device that propagates the devices longitudinal and latitudinal coordinates. The coordinates are identified on a map to provide a complete address that usually includes a country, city ,town/colony ,building name and street address. In this project we will be using Breadboard Node MCU Google location API in order to track down the most precise geographical location of the

entity. The Node MCU component makes the system extremely efficient and user-friendly to work with and implement. We can trace location any device without GPS module only using NodeMCU.

2. LITERATURE SURVEY

Manav Singhal¹ , Anupam Shukla²[1]**Implementation of Location based Services in Android using GPS and Web Services** published in international journal of computer science ,from this paper we have learnt the location based services that are present in android through which we can get the location.This paper has working of geolocation API that id being adopted in the proposed design.It has all the location based services that are present in android.

Rumi Juwairiyyah , Kajal Kasat ,Jyothsna Bhushan , Jayaraj[2]**Geolocation using NodeMC**published in

International Journal of Advance Research, Ideas and Innovations in Technology from this paper we have learnt how to use geolocation API to find the location. This paper has given how to use Node MCU for location tracking and the geolocation API. But due to the usage of GPS module the power consumption is high and without GPS enabled it cannot find the location coordinates.

3. EXISTING METHOD

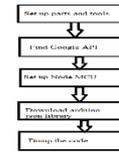
In the existing method the GPS module is placed and the geolocation API is also used for the accuracy.

The components used in the existing system are: Node MCU, GPS module, Geolocation API. In this system the interface of GPS and Node MCU is done and a simple local web server is created using NodeMCU and the location details are updated in the webpage of the server. ESP8266 can be used for geolocation by firstly obtaining nearby API properties, and then using Google geolocation API to find the location of the user-device and it is able to obtain a fix on the location of the device that integrates the ESP8266 micro controller, we assume that the host controller first could obtain data from nearby Wi-Fi networks or cellular sub-systems. The data is present into a data block that must be sent to an online geolocation API or service that will estimate the device location in terms of latitude, longitude, and accuracy.

4. PROPOSED METHOD

The proposed method in tracing the location without GPS module involves in the following steps:

1. A device obtained SSI, RSSI and MAC addresses characteristics of nearby Wi-Fi access points and cellular sub-systems.
2. Then the obtained information is consolidated to data block.
3. The data block is transmitted to Google's geolocation service with the help of geolocation API.
4. The geolocation estimates the latitude and longitude in degrees as well as the estimated location in meters.
5. The service returns the JSON-formatted output response back to the device.



Hardware Components: Node MCU, Breadboard

Node MCU is a hardware that works as similar to Arduino board. It is microcontroller unit with Wi-Fi and SOC. It has only one analog pin. This firmware device is good at connecting to the cloud. This is a device where the objects are being connected using Wi-Fi Protocol. Since we are using the Google cloud to find the location Node MCU is efficient device for connecting to the Google cloud.

Set up Node MCU:

1. Download Arduino IDE from the following link: <https://www.Main/Softwarearduino.cc/en/>
2. Add NodeMCU board on Arduino IDE
3. For uploading code on NodeMCU you have to add the NodeMCU board on ARDUINO IDE
4. Go to file & Preference in Arduino IDE
5. In Additional Board manager section copy the following link
6. http://arduino.esp8266.com/stable/package_esp8266c... and click on ok
7. The board is downloaded
8. Go to the tools and board and select NodeMCU 1.012E
9. See the above picture for easily understanding

Download Arduino JSON library:

1. Go to the Sketch-->Include Library-->Manage Library
2. Type ArduinoJson in the search box
3. Download the latest version of ArduinoJson library
4. After downloading library close
5. Add library from the commands Sketch-->include Library-->ArduinoJson

Finding Google API:

1. Open your browser and type: console.developer.google.com
2. Create a new project
3. After create a new project click on credential
4. Click on API key
5. Your API key has been generated
6. For easily understanding see the following picture

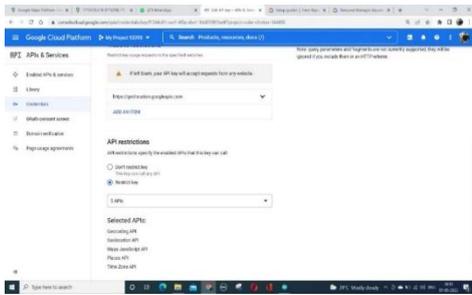


Fig:4.1

North America, and South America are all available as regions. Each area consists of zones that are separated inside the region. Each zone has a unique name that combines a letter identification with the region's name. For example, in the East Asia area, zone an is coded as asia-east1-a. This resource distribution has various advantages, including redundancy in the event of a failure and it will reduce the latency by placing resources closer to customers.

5.RESULTS

The output returns the coordinates of the location where the Wi-Fi exists.

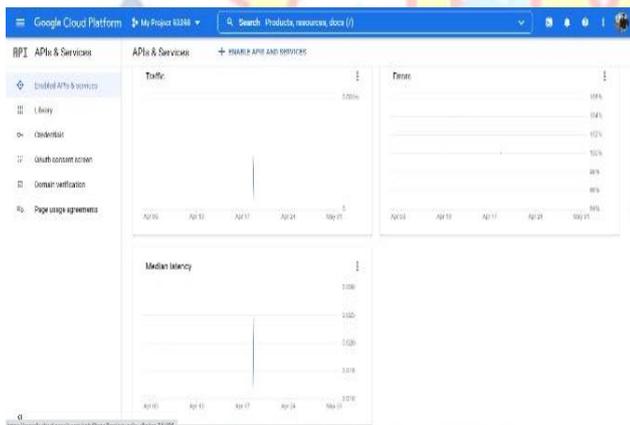


Fig:4.1.1

```

scan done
2 networks found
{
  "token": "AlzaSy8D1_c3mmbFS_YSN-lddyXl_4yopyTbx0",
  "id": "GLET CAMPUS",
  "wifi": [
    {
      "bssid": "A6:50:BF:93:26:9D",
      "signal": -32
    },
    {
      "bssid": "28:AC:67:0B:22:A4",
      "signal": -90
    }
  ]
}

Requesting URL: https://maps.googleapis.com/maps/api/js?key=AlzaSy8D1_c3mmbFS_YSN-lddyXl_4yopyTbx0
17.059880,01.868906
  
```

Fig:4.2

CONCLUSION:

In the end, we have created a system that locates the objects exact geographical location irrespective of the type of object. This system does not require any

expensive materials and can be implemented in all possible fields be it from industries to defence to navy to agriculture and so on. It is extremely user-friendly and doesn't contain complex procedures. This system provides us with a location based on the coordinates generated.

FUTURE SCOPE:

The optimum system for tracking anything should be able to: 1) work both indoors and outdoors 2) provide a lengthy battery life 3) have a sufficient radio range 4) be inexpensive to set up and operate 5) not necessitate the use of a computer. This cloud system helps us in finding the location of a device without using GPS module of the device. The power consumption will be reduced by using the cloud API s for finding the location. These system are helpful where the power consumption should be low. The Node MCU has a Wi-Fi protocol through which we can have many benefits it will helpful in the military systems where power availability is low. This can used by the payment apps and the mostly used apps for finding the location using cloud i.e geolocation APIs .This cloud range connects to the maps which gives us the location.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

REFERENCES

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