

Beacon Based Vehicle Tracking and Vehicle Monitoring System

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Abstract: In this paper i beacon is used for notifying vehicle to the Smartphone or tablet devices and to find out current location of vehicle passed on the road and maintain the record in details of the vehicle for find the location and pointed the vehicle, so many applications and methods i beacon is used such as patient monitoring and store navigation, disaster recovery the I beacon will be used in this paper, we propose monitoring the vehicle crossing on the road or passed on the road purpose i beacon used to express more details about the vehicle passing on the road. Evidence of the vehicle obtainable to the authorized user who all using the application with authorization and permission it will be transmitting the information about the vehicle and transmitting in partial range i beacon transmitting to the user can only access with the major and minor of the I beacon notification. Future where location evaluation is performed by calculating times and speed of the vehicle crossed on the road. Positioned of Bluetooth transmitters' signal levels at certain point data will be stored in known base stations. All that information will be used for store about vehicle information in the nearest base station. When it comes to using more evidence of I beacon further it broadcast the information with low frequency.

Keywords: I beacon, beacon tracking architecture, beacon notification.

1. INTRODUCTION

IBeacon provides various location-based facilities after settling the position mechanically without extra user's exploit such as NFC (Near Field Communication) or QR (Quick Response) RFID. For these reasons, IBeacon receives a lot of thoughtfulness. Not only Apple but all enterprise so many company harvest such as Qualcomm, Eddy stone, PayPal, and SKT carry forward related business by affiliating with a variety of company I beacon. Particularly deployment in the range focused offline distribution endeavor is extended to digital content, smart car and smart home. So thoughtfulness of industry for IBeacon is increasing further work and also can be used for education purpose. Especially indoor localization is of actual interest where satellite based standing methods cannot be used, since receivers usually fail if line of picture visibility to the satellites are lost.

Bluetooth is a wireless network technology standard for exchanging and broadcasting Data over short distances with low consumption. It uses the frequency band between (2400 MHz and 2480 MHz). Bluetooth 4.0 is a widely used Standard for personnel wireless area networks and is a network technology among mobile devices and other devices. it is mainly used for low power and short range connections, low cost which is necessary for mobile and embedded devices. in recent years with the growth of mobile phone and tablet market, it became the preferred method for short range connections. Many PC accessories such as mice, keyboards, and headsets also include the Bluetooth standard for wireless connection network for communication to smart device.

Beacon is attached in owner vehicle such as car, bus anything we can connect beacon device in the vehicle to find out the location and speed of the vehicle is crossing on the road all those evidence will be store all those in base station on the road side through i beacon it transmitting the in oration will access through UUID and major, miner accessing the data. Which the beacon access the devices through smartphone we can check the car is located the current position .this method is used for visit the parking location

2. RELATED WORK

This car security system comes with added secure access and intelligent disturbing. The system only can be edited and formed by owner using Bluetooth module communication in the driving style in this paper .The Bluetooth module will sent impostor alert message as PIC microcontroller receive gesture from PIR sensor. The PIC is programmed to wait roughly seven minute before stimulated the alarm. The alarm system status is indicated using LED's indicator to avoid owner accidentally turned it off [1]. Home or office environment the motorized environment represents a relatively underdeveloped application arena concerning the running of new facilities .One of the key elements for achieving such a task is an appropriate, wireless delivery media. The integration of existing and new communication technologies requires an appropriate in-car infrastructure for the funding of statement, information and entertainment services.. The paper describes concepts for mixing of the Bluetooth

technology, the achievable program performance and a potential user tender framework [3].

This paper aims to investigate the technical reflections involved with interacting groups of mobile users via Bluetooth with their mobile devices. Range, security and operational limitations are all considered. Finally, possible claims and their technical suggestions are discussed, containing gaming, IM and file sharing, file allocation. The influence of such technology on prevailing mobile networks is studied [4].

In the vehicle we can attached the beacon in the vehicle for monitoring the vehicle were is located. What time the vehicle is crossed the road we can use the beacon through app in the smartphone access through wi-fi or Bluetooth. All those data will be store in the base station as a ibeacon will transmitting the data as a message to base station and send data information as message notification to smartphone.

In the vehicle Always use the GPS Tracking Unit in a method of finding the position of the vehicle and also monitoring deriver reduce your usefulness and ability to drive carefully and safely when driving the car. Map the location with time and date will be updated on the mobile app history here to all applicable traffic laws and motor vehicle regulations appropriate to the GPS Tracking Unit. Do not place on or near an airbag. Such connection could restrict with airbag positioning or could cause the invention or another entity to become a gunshot, which could result in somber personal injury to residents. Ensure the vehicle location will not block your dream while driving. On the traveling time it will show the information about the vehicle gathering information of parts and missing parts of the vehicle will be show as notification message to the smart phone while on driving and the beacon will automatically change into driving mode on the application profile.

3. BLUETOOTH LOW ENERGY

Bluetooth Low Energy BLE operates spectrum band (2402-2480 MHz), divided in 40x2MHz physical channels and uses GFSK variation, attaining a data rate up to 1 Mbps. A major advantage of BLE over the traditional Bluetooth is that it has been designed to support both connectionless and connection-oriented applications. Depending on the required method of the ibeacon, a BLE device may task in changed methods, i.e. publicizing when it has to notify its incidence, scanning when detecting of smart devices in its area has to be accomplished, connected as a master or a slave when data transmission is needed. When a connection is essential, a Bluetooth Low Energy master device may connect to unlimited slave devices such as star topology picoted, thus overtaking the classical Bluetooth, which only supports seven energetic slaves in a twisted. The radar nodes can be a change of smart devices and a Smartphone can be used as the interconnect message to over the 100 meter to run on

Internet connectivity.

The Bluetooth Low Energy defines numerous profiles for low energy devices specification for how a device works in a specific application. While manufacturers are expected to implement the fitting conditions for their device in order to ensure compatibility, they are also allowed to define their own protocols for custom applications.

Generally, these applications take into account that the RSSI value cannot deliver correct distance approximation due to many motives. For instance, the 2.4-GHz band, in which BLE operates, is The most dominant one in wireless communications, used also by the global 802.11/Wi-Fi and other personal area network technologies, like ZigBee. To reduce interfering by other technologies working in the same band, Furthermore, the radio signals quality depend on the working appearances of the transceivers, such as the antenna gains and the receiver feeling on the smartphone and physical obstacles, like walls, moving persons, etc. Reflection, scattering, bending as well as the estimate perfections produce significantly different route sufferers for equal distances. All the above means that the RSSI value from a BLE-enabled device benevolences major variations in time and space. Reliable GPS signals. Furthermore, GPS is not suitable for reliably liable distances within 15 to 20 meters. For that reason, some mobile applications also use triangulation of signals from cellular towers or Wi-Fi hotspots to obtain the device's geo-location, but the results are quite approximate regarding both stability and precision.

In more details, Ibeacon are low-complexity transmitters that promote a particular BLE payload with identifying information:

- *Proximity UUID (universally unique identifier):* 128-bit value that uniquely identifies one or more Ibeacon as being of a assured type organization. This identifier is compulsory.
- *A major value:* 16-bit unsigned numeral used to segregate Ibeacon that have the same immediacy UUID. This value is voluntary.
- *A minor value:* 16-bit unsigned numeral used to separate Ibeacon that have the same immediacy UUID and major value. This value is also voluntary.

ibeacon that present the same UUID form a beacon region. Then, when a mobile device with BLE enabled app enters the ibeacon region, it will receive a appropriate notification. These apps can also monitor the relative distance to the ibeacon, using the RSSI value.

4. IBEACONS HARDWARE

Ibeacon spreaders come in the form of hardware that runs on Bluetooth Low Energy (BLE). The BLE specification

is used to create BLE devices, which are then embedded or communicated into the devices. These devices- otherwise known as beacons, transmitters, or broadcasters - can come in the form of any type of hardware such as USB dongles, computers, small coin-cell powered gadgets, etc. All iPhone 4S and newer and iPad 3 and newer devices that run on iOS7 can also be Ibeacon transmitters. These transmitters regularly in a distance from a few up to 70 or 100 meters to all Bluetooth devices that are joining for the ibeacon indication. If your device is receiving a signal from the ibeacon and it knows A. Hardware consideration of Ibeacon

1) Battery life: ibeacon device receivers are required to communication at a frequency compliant with Apple specifications ,and having tested several battery-powered Ibeacon at Apple's optional frequencies, we've discovered that battery life of coin-cell Ibeacon models can be as little as 2 or 3 months. Beacons have the option of being powered by batteries or a fixed power source, used in such devices like as a USB port on a POS terminal. To less maintenance costs, Ibeacon running on a fixed power source is most ideal.

2) Beacons encasing: ibeacon offer the versatility of being placed anywhere - indoors or outdoors position. The test comes when beacons are deployed in environments that are disposed to weather conditions such as rain or humidity. Ibeacon encasing should be resilient to such conditions, especially when connected to outdoors position

3) Beacon management: Rather than physically going out to each Ibeacon to update its UUID or firmware, there needs to be a system to remotely manage a network of beacons. This is particularly important for large scale ibeacon arrangements in areas such as shopping malls, arenas, or airports and many places ibeacon can be used. IN such case the Ibeacon network is backed up to a cloud storage.

4.1 RFID

RFID tag used for the Vehicle Tracking Explanations manages and control the movement of vehicles. RFID tags or ibeacon are attached on vehicles and fixed on the vehicle setup is placed at tactical locations such as entry / exit gates, weigh-bridges, parking lots and stuff. This allows totally automated wireless notification of vehicles without impacting on present vehicle processes on the monitoring node.

Our Vehicle Tracking Solutions can add the following efficacies to vehicle management processes:

Traffic & Line Management: Automatically notify of vehicles to exploit effectiveness and prevent working gridlock and without traffic signal.

Driver Identification: who is driving which vehicles and at what time is crossing where is located.

Weighbridge Automation: Automatically identify trucks at weighbridges, their vehicle proof of identity data and weight depths to rise procedure effectiveness

Collision Avoidance: Designed to help prevent crashes between heavy and light vehicles, an alert is made when a truck comes within a final choice of further means of transport. These automatic proximity alerts help to drop costly.

The beacon hardware is safe by an appropriate solid, IP rated enclosure designed for outdoor use. The enclosure includes a beacon reader as well as power and communication hardware. Detected raw beacon data is processed and can be used to drive multiple of applications. For example a number of components including variable message signs, boom gates.

Features:-

- Admin Login: Admin will Login with his admin ID and password.
- View Vehicle and Driver Location: - Admin can view vehicle and driver location.
- Registration: Admin will register the driver by entering driver details.
- User Login: User can login with user ID and password.
- Vehicle Tracking: System will track location of both vehicle and driver using GPS.
- Send Location Details: System will send location details to admin.

5. EXPERIMENTAL RESULTS AND COMPARISONS

Organizations that deal in transportation or movement on the road mostly prefer GPS devices to enable **beacon** so that they can get the strict place and location while the vehicle is on the run. To make **beacon** possible, the vehicle must have a GPS device on the smart app and must be tuned with its corresponding GPS tracking device where the signals from the satellite can be received the message on the smartphone With the help of GPS systems, Beacon is a flexible software application that can be deployed on a centralized or distributed infrastructure. Its primary responsibilities include sending HW control commands, receiving and filtering raw RFID data and output Formatting.

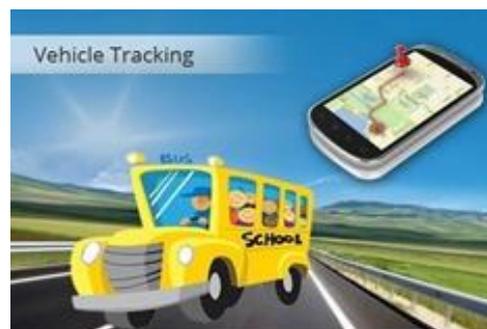


Fig5.1

In the vehicle we can attached the beacon on the vehicle for monitoring the vehicle on the smartphone itself and we can also located what time the vehicle is crossed the road we can used the beacon to measuring or monitoring the vehicle from the app on the smartphone access through wi fi or Bluetooth of the vehicle information .All those information will be store in the road side of the base station as beacon will transmitting and receiver there data as a message to base station and send data information as a message notification to smartphone we can access from the application od beacon monitoring vehicle. And successfully requires a fervent radio transceiver, avoiding the wireless channel from being used for a In this paper, we proposal an method that allows the wireless channel for communication through ibeacon transmissions to be importantly reduced while retaining very low traffic estimation to evaluate location and speed signals from alternating wireless ibeacons and foresee the undercurrents of the traffic behavior in between.

The beacon is connected on the vehicle we can find out the position of the vehicle is located we can find out all information about the vehicle from the smartphone itself near-term to a location near you. Tracking with help of ibeacon, little wireless sensors that intimate through apps in your smartphone or tablet that you're nearby location are making their way easy located the items on the road retailers, supermarkets, museums, drug stores, and all manner of public places and important place will be shown on the smartphone look like maps identification point. The beacon is place on the car to tracker the road and location had been positioned in phone Bluetooth around Following ibeacon accumulate data, rather, they aware the apps in a smartphone Those apps can then send messages notification, usually in the form of push notifications.

5.1 Vehicle Location

In order to achieve vehicle location and navigation roles, the locating system should have the ability to govern its up-to-date location within 20 meters of its tangible location over 90% of its travel time. This 20 meters firmness is required to separate between closely spaced parallel road segments, and therefore minimizes the map-matching errors. In addition, as a addition to accuracy, the 90% of time treatment is demanded. Here we consider the exactness as how closely the location amounts agree with the actual location of the targets. The locating accuracy can be defined by root mean square (RMS) or standard deviation.

5.2 Vehicle Location Using Mobile Phones: Survey And Prospects

More generally, accuracy, geometric dilution of precision (GDOP) and coverage are three important act measures for locating systems. A common measure of accuracy is the evaluation of the mean-square-error (MSE) of the section estimate with the putative MSE based on the Cramer-Rao lower bound (CRLB).

The MSE in two dimensions is given by:

$$MSE E x x y y 2 2 == - + - e [() ()] ^ ^ (2.1)$$

Where () x y, are the directs of the target and (x y ^, ^) is the projected position.

In addition, the GDOP provides a size of the effect of the base stations' shape on the location estimate. It is defined as the affiliation of the RMS position mistake to the RMS flashing fault, which is given by:

$$r E x x y y GDOP 2 2 [() ()] ^ ^ s - + = (2.2)$$

Where, r and s denotes the central ranging error.

Another evaluation metrics of placing system is coverage. It is defined as the amount of an area of interest that is provided with an tolerable level of service by the locating system

5.3 Data Processing And Aggregation

Quality and quantity of the location data made from traffic imitation should be reduced in order to follow the honest field condition. As described in Section 5.2, location data should be besmirched in two ways: 1) Setting a specified percentage of replicated vehicles/mobiles to act as traffic inquiries, and 2) Introducing arithmetical locating errors of A-GPS mobile phones.

The SUMO simulation output file “net-state dumps” may grow very large since it encompasses detailed information of each vehicle/mobile. The location updates include the latitude-longitude synchronizes, their accuracies, and the equivalent timestamps. Flat accuracy (in meters) is the root mean square (RMS) of the north and east accuracy Under the Gaussian supposition this implies that the actual location is within the circle defined by the repaid point and range at a chance of about 68%. the A-GPS location GPS units, they still appear sufficient for traffic state estimation of vehicle trajectory samples collected by the A-GPS mobile phone.

iBeacons can gather the phone’s unique identifier number 12-digit code that can allow a located the main location of the shop or home pointing the location offer on single device and to track possessions like interval times ,coming time and where the shopper moves in a located all those evidence will be show as message in the smart electric device .

6. CONCLUSION

This concept as that all the vehicle information will be store in the road side base station, the information store as the time of the vehicle passed on the road or details about the vehicle will be store in the base station we can access through smartphone or tablet itself without authentication stored information will not access by the user. I beacon is

used for short range information will be passed and store the details about the vehicle into the database or it will show the information on beacon based notification on the smartphone. With beacon can communicated through Bluetooth with low energy consumption transmitting to the smartphone.

REFERENCES

1. K.V.S.S.S.S. Salram, N. Gunasekaran, and S. Rama Reddy, "Bluetooth in Wireless Communication ", IEEE Communications Magazine, June 2002, pp. 90-96.
2. G. Lamm, G. Falauto, J. Estrada, and J. Gadiyaram, "Bluetooth wireless networks security features", Proc. IEEE Workshop Information Assurance and Security, 2001, pp.265 -272 .
3. R. Nüsser and R . Pelz, "Bluetooth-based wireless connectivity in an automotive environment", Proc. IEEE Vehicular Technology Conf.- Fall, vol. 4, 2000, pp.1935 -1942.
4. P. D. Garner, "Mobile Bluetooth Networking: Technical considerations and applications", The IEE, Michael Faraday House, 2003, pp. 274-276.
5. P. Murphy, E. Welsh, and P. Frantz, "Using Bluetooth for short-term ad-hoc connections between moving vehicles: A feasibility study", Proc. IEEE Vehicular Technology Conf. (VTC), pp.414 - 418 2002 .
6. Walt Kester, The Data Conversion Handbook, Analog Devices, Inc, USA, 1994.
7. Behzad Razavi, Principles of Data Conversion System Design, Wiley-IEEE press, New York, 1995.