

Track your belongings, find it, and never lose it using IoT

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Abstract Most of the time, we tend to leave our belongings behind due to many circumstances, which leads to losing it, or we tend to forget where we have kept our belongings and, in the end, find it tough to search around or accidentally we lose our belongings in a public place and we can't find it. The proposed IoT device solves the above addressed problems using BLE Technology with the help of mobile application for the purpose of tracking. Multiple tags can be shared at once and there is an option to share our belongings with anyone. This proposed solution is a cost-effective and efficient solution where one can find lost/theft belongings, get an alert message, when our belonging is away by a certain range and helps us find it.

Index Terms— Bluetooth Low Energy, Internet of Things, Mobile Application, Tracking

I. INTRODUCTION

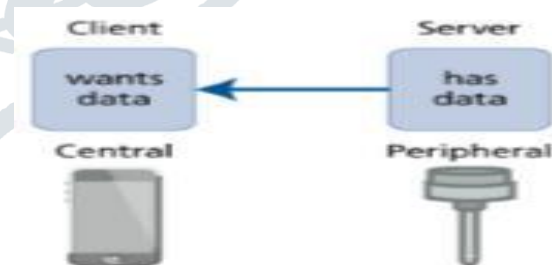
THE latest low energy wireless communication protocols within the Bluetooth four.0 specification square measure driving an entire new market of battery steam-powered and moveable systems Bluetooth has become a key communication technology as a results of its place in smartphones and pill computers. The widespread accessibility of Bluetooth good prepared phones implies that developers do not got to worry concerning making the separate gateways which will be needed by different IoT wireless connections. Instead, associate degree app running on the good phone are often accustomed deliver the interface, whether or not for a pulse rate monitor, toy or remote. This Bluetooth affiliation conjointly reveal the web and cloud services to the developer, permitting information to collected mechanically and compiled, delivering far more computing power than is accessible within the target style or perhaps the smartphone. whereas this has been attainable within the past, the new Bluetooth Low Energy (BLE) specification that's a part of Bluetooth four.0 makes this affiliation abundant easier to implement within the IoT node. Reducing the ability consumption reduces the load on the battery within the node and extends its life within the finish instrumentality to months or perhaps years. This has been a key driver within the adoption of the new specification, particularly within the embedded market.. The efficient technology employed in this projected IoT device is Bluetooth Low Energy

BLE can be tagged to many of those important items which we tend to lose or forget or may be stolen in our day to day life such as hard disks, laptops, car keys and so on.

A link is established by the BLE between the tagged items and the mobile device hosting the software to exchange information with each other within certain range. Any range can be set up between 0 and 200ft. With this feature location and movements of the belonging can also be tracked.

The only limitation of Bluetooth tracking is the proximity based system i.e., it can track only upto a certain range. But it can be overcome by "crowd delay" mechanis, which means the lost tracker can be traced if it is greater than 200ft by another Bluetooth tracker which crosses by that certain range.

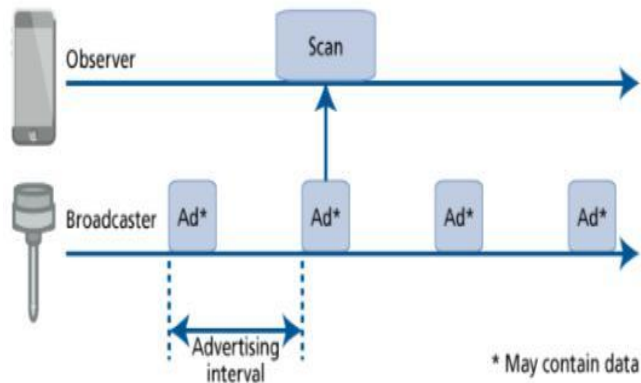
Client and Server concept in Bluetooth low energy



Bluetooth low energy uses a shopper / Server model. A shopper (that "wants data") connects and accesses one or many Servers (that "has data"). The shopper usually operates within the Central role and therefore the Server operates within the Peripheral role. Typically, a sensing element or an adjunct is that the Server / Peripheral and a laptop, phone, or pill is that the shopper / Central device.

"Advertising" is how devices are found in Bluetooth low energy

Since the devices are in sleep-mode till a commercial is initiated, the advertising feature allows Bluetooth low energy to stay the facility consumption to a minimum.



The slave device (now having the Broadcaster role) is "advertising" once he needs to attach. The consumer is scanning for brand spanking new devices (acting within the Observer role). once the Observer finds a tool it needs to attach to, it initiates a affiliation. The advertising might contain broadcasted knowledge.

	Bluetooth	GPS
Price	Relatively Cheap	Upward of \$50
Connection Range	Max 200 ft (60 m)	Constant Connection
Battery Consumption	Low power consumption	High power consumption
Sound Alerts	Enabled	Optional
Geofencing	Dependent on the Bluetooth Signal	Multiple areas setup
Community Help	Anonymous help searching	No Community help available
Size	Small and thin	Bulky in size and heavier
Rechargeable Battery	Rechargeable models available	Rechargeable models available

III. BLUETOOTH LOW ENERGY V/S GLOBAL POSITIONING SYSTEM

It is very important to know the difference between Global Positioning System – which sends the location through co-ordinates obtained from the satellite and Bluetooth trackers which provide mutual distances between objects.

Global Positioning System could be a combination of subtle software package to present time period observation of the position and movement of a labelled object, over a doubtless international vary that’s lined by the satellite distribution and mobile communications network coverage.

Bluetooth trackers, on the opposite hand, can change the software package to ascertain the last glorious location of a labelled object, and permit a Bluetooth affiliation to be re-established with associate item once it’s in an appropriate vary of the mobile device hosting the pursuit app. because the price of BLE is far cheaper than any GPS, individuals get BLE trackers and therefore our lost belongings is copied

To track an object one can’t place a bulky GPS tracker to track an object, so Bluetooth tracker are beneficent.

One need not keep paying for monthly subscription of GPS while Bluetooth trackers are one time investment.

If GPS is lost, it is lost forever, one cant trace it back. If this device using BLE is lost through community finder, one an trace the lost belonging back.

IV. HOW THE DEVICE WORKS?

This device comes with four modes of operation:

A. *Active Tracking Mode:* We might forget our laptop behind. To prevent this we can set an alert if it is away from us by a certain range. The range can be set by us say from 10-200ft. If the laptop bag which has the device is away from our phone by that range, then the phone sets up an alert in the form of an alarm. Thus preventing us from forgetting.

B. *Manual Search Mode:* In this mode, we can easily search our belongings, if misplaced. If the item is far away, then the map on the mobile shows us its last known location and helps us tracking it. The alarm starts buzzing on the phone when the lost item is in 100m range and when found on the map, we can shut down the alarm.

C. *Phone Protect Mode:* What if we forget our phone which has the app in a crowded area? This mode saves us from the issue. In such cases we can select this mode beforehand in the app, and keep both the phone and the device close to us. If our phone is away from the range which can be customized, then the device beeps making us alert.

D. *Combined Mode:* This mode is a combination of Active Tracking Mode and Phone Protect Mode where both the device and the phone beeps making everyone in the surrounding if any one of those is stolen

Multiple objects can be tracked at once using one device, be it anything, there is also an option of community finder.

If our object is lost and is not in the reachable signal. Then anyone who is using the same app in the phone, passes by our lost object, our device updates its signal in our app and thus helps us find it.

V. CONCLUSION

This IoT device using BLE Technology helps our belongings from being stolen and also helps in tracking them through a mobile application. The various features of the BLE is analyzed and its outcome is brought out by developing into a complete product in this paper.

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