Smart Object Finder by Using Android and Bluetooth Low Energy

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ABSTRACT: The main goal of this project is to help people who lose their objects frequently and also to avoid stolen of object. Usually people get frustrated when they lose something such as wallets, keys, pen drives, laptop, etc. An object finder is capable of locating an object of interest in a 150 meters range. In this project we use android latest version 4.4 kitkat with Bluetooth low energy technology which having 4.0 version. Android powers hundreds of millions of mobile devices in more than 190 countries around the world. This project relates in general to systems and devices for enabling persons to easily locate and find lost or misplaced objects or items common to a household or office environment, and more particularly to a system utilizing a wireless transmitter (Android app) and plurality of wireless receiver (Bluetooth tag) attachable to objects or item needing to be located at various times. The object could be anything such as luggage, a car, a bicycle or even a person. We write code for android app in Eclipse Juno. Then the .apk file is installed in Smart Phone. The BLE 113 Bluetooth module is developed by Bluegiga technologies which is use in the tag. It will be programmed by smartbasic. There are two possible mode of project one is when user wants to find the object which having attached tag by using app then he have to open the app. Connect Bluetooth & transfer data to tag then tag will beep loudly. By hearing voice we can reach towards the object. So by using this we can find out our misplaced object. The another mode is when we activate the tag already by app and whenever the Smartphone is goes out of range then app will beep loudly by showing message you are not with your object. The first mode is explained in this paper. Our smart object finder is low cost effective. Because android is open source. So app is almost free of cost. Tag contains Bluetooth module with buzzer. CR2032 AAA size battery is required for supplying a tag.

KEYWORDS: Bluetooth Low Energy (BLE), Software development kit, Eclipse, Integrated development environment (IDE).

1 INTRODUCTION

Electronics plays a very important role in developing simple to complex devices used for any purpose. In every field electronic equipments are required. The best achievement as well as future example of integrated electronics in technical field is Smart Phone. Today most of the smart phone uses Android operating system. Android powers hundreds of millions of mobile devices in more than 190 countries around the world. It's the largest installed base of any mobile platform and growing fast—every day other million user's power up their Android devices for the first time and start looking for apps, games, and other digital content. Android gives you a world-class platform for creating apps and games for Android users everywhere, as well as an open marketplace for distributing to them instantly.

People get frustrated when they lose something such as keys, pen drives, laptop, etc.

An object finder is capable of locating an object of interest in an adjustable range. This project relates in general to systems and devices for enabling persons to easily locate and find lost or misplaced objects or items common to a household or office environment, and more particularly to a system utilizing a wireless transmitter (Android app) and plurality of wireless receiver (Bluetooth tag) attachable to objects or item needing to be located at various times. The object could be anything such as luggage, a car, a bicycle or even a person .The problem of finding an object could be the problem of finding a specific car in car park, finding luggage on a luggage conveyer in an air port, finding a specific bike in a school yard or finding

a person such as child in a school yard or in shopping centre. The problem of detecting the loss of an object could be detecting whether object is being stolen or whether the object has been forgotten.

Fig. 1. Scenario of Project

Called finder tags are the most advanced object finder to locate objects directly from your smart phone. It uses the *Bluetooth* 4.0 technology (also called *Bluetooth Low Energy* - BLE) which can last over 12 months on a coin cell battery. The BLE 112 Bluetooth module is developed by 'Bluegiga' technologies which is use in the tag. The system can be used to locate objects up to 150 meters. You can attach the Called finder tags to easily misplaced objects, such as keys, wallets, purses, remote controls, canes and umbrellas, etc. When the System is activated on your smart phone, the Called finder tag will beep and flash. The object Finder app has a unique feature to guide you towards the lost object. It has a signal strength indicator which gives you a sense of distance between you and the lost object.

The Electronic Leash service ties your Called finder attached object to your smart phone. Alerts will be sounded if the two are separated at a distance on the smart Phone, the Called finder or both. The location is also recorded to help you return to look for the lost object. Electronic Leash is perfect for situations such as keeping any eye on wandering kids/pets in a park or your valuables when travelling.

1.1   NECESSITY

- Generally speaking methods and devices for the identification and detection of objects exists.
- Considering the example of luggage which is typically labelled with hand written or bar-coded label indicating the identity of the owner of the luggage. However the hand written label can be impossible to read either due to hand writing that is difficult to read and the label may be destroyed by the humidity or by the transported by the luggage.
- The hand written label does not by itself constitute a guarantee for identity of the owner of the luggage since it is easy to change the label or to write a label with wrong name or address.
- More ever the label does not alert the owner if the luggage is either forgotten or stolen.
- A badly written tag can cause that the object ends up in a wrong destination. A system for identification of person exists but they also have drawback in detection.

1.2   THEME

- Idea: Borrowed from frustrating people who lose their object frequently.
- This system works equivalently like when we want to find someone then we call him or her by calling their name and if he or she is present in range of our call he or she will give reply to us. In the same way, our system will also call an object by their ID's which are set by the system for them.
- All these things can be achieved by creating an application using Android operating system as transmitter in our system and Bluetooth version 4.0 modules as a tag which is attached to an object which works as a receiver in our system.

2   EXISTING SYSTEM

The present systems generally relates to an object finder and, more particularly, to an object finder capable of locating an object of interest in an adjustable range. An object finder may include a transmitter and a receiver. The transmitter is generally attached to an object of interest, for example, a child, while the receiver is held by an adult. In operation, the

transmitter periodically sends signals to the receiver, which is able to receive the signals in an available range. Once the receiver loses contact from the transmitter, an alarm device of the receiver may be activated to signal the receiver party that the object is out of the range.

Some receivers of object finders on the market may not be user friendly. For example, a super-regenerative receiver may have low signal sensitivity, undesirable stability and low signal-to-noise ratio. To solve this problem, an additional amplifier circuit may be integrated into such receiver product and thus results in higher power consumption and circuit complexity. As to a super-heterodyne receiver, signals can only be received in a range of a fixed distance from the transmitter. If the transmitter and the super-heterodyne receiver draw closer or go beyond the range, signals coming from the transmitter would no longer be received. It may therefore be desirable to have an object finder that has a receiver capable of receiving signals in an adjustable distance from the transmitter. It may also be desirable to have an object finder that has a power-saving receiver of relatively high signal sensitivity, desirable stability and signal-to-noise ratio.

- Smaller Range.
- Larger in Size.
- Not User friendly.
- Low security.
- Only one object could be located with the system.
- Complex in design.
- No alarm facility.
- Low signal Sensitivity

3   PROPOSED SYSTEM

The aim of proposed system is to develop a system of improved facilities. The proposed system can overcome all the limitations of the existing system. The system provides proper security and reduces the manual work.

- Security of data.
- Ensure data accuracy's.
- Minimum time needed for the various processing.
- Greater efficiency.
- Better service.
- User friendliness and interactive.
- Minimum time required.
- Comparatively less price.

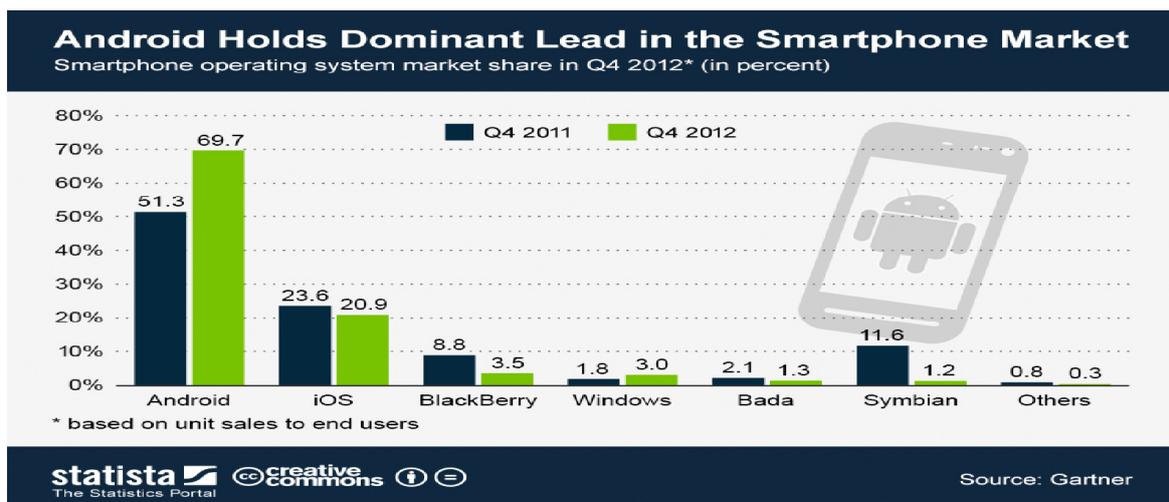Android is used as an operating system which is present in near about all smart phones.

Fig. 2. Graphical representation of android user

Android powers hundreds of millions of mobile devices in more than 190 countries around the world. It's the largest installed base of any mobile platform and growing fast—every day another million users power up their Android devices for the first time and start looking for apps, games, and other digital content. Android gives you a world-class platform for creating apps and games for Android users everywhere, as well as an open marketplace for distributing to them instantly [4]. Building on the contributions of the open-source Linux community and more than 300 hardware, software, and carrier partners, Android has rapidly become the fastest-growing mobile OS. Every day more than 1 million new Android devices are activated worldwide. Android's openness has made it a favourite for consumers and developers alike, driving strong growth in app consumption. Android users download more than 1.5 billion apps and games from Google Play each month. With its partners, Android is continuously pushing the boundaries of hardware and software forward to bring new capabilities to users and developers. For developers, Android innovation lets you build powerful, differentiated applications that use the latest mobile technologies [4].

3.1 POWERFUL DEVELOPMENT FRAMEWORK

Easily optimize a single binary for phones, tablets, and other devices. Android gives you everything you need to build best-in-class app experiences. It gives you a single application model that lets you deploy your apps broadly to hundreds of millions of users across a wide range of devices—from phones to tablets and beyond. Android also gives you tools for creating apps that look great and take advantage of the hardware capabilities available on each device. It automatically adapts your UI to look its best on each device, while giving you as much control as you want over your UI on different device types. For example, you can create a single app binary that's optimized for both phone and tablet form factors. You declare your UI in lightweight sets of XML resources, one set for parts of the UI that are common to all form factors and other sets for optimizations specific to phones or tablets. At runtime, Android applies the correct resource sets based on its screen size, density, locale, and so on [7].

To help you develop efficiently, the Android Developer Tools offer a full Java IDE with advanced features for developing, debugging, and packaging Android apps. Using the IDE, you can develop on any available Android device or create virtual devices that emulate any hardware configuration.

3.2 ANDROID 4.3

Android 4.3 gives you a single, standard API for interacting with Bluetooth Smart devices. Android 4.3 introduces built-in platform support for **Bluetooth Smart Ready** in the central role and provides a standard set of APIs that apps can use to discover nearby devices, query for GATT services, and read/write characteristics.

With the new APIs, your apps can efficiently scan for devices and services of interest. For each device, you can check for supported GATT services by UUID and manage connections by device ID and signal strength. You can connect to a GATT server hosted on the device and read or write characteristics, or register a listener to receive notifications whenever those characteristics change. You can implement support for any GATT profile. You can read or write standard characteristics or add support for custom characteristics as needed. Your app can function as either client or server and can transmit and receive data in either mode. The APIs are generic, so you'll be able to support interactions with a variety of devices such as proximity tags, watches, fitness meters, game controllers, remote controls, health devices, and more [4]. Following are the features of android 4.3:

1. Bluetooth low energy support.
2. OpenGL ES 3.0 support, allowing for improved game graphics
3. Restricted access mode for new user profiles
4. File system write performance improvement
5. Dial pad auto-complete in the Phone application
6. Improvements to Photo Sphere
7. Reworked camera UI, previously introduced on Google Play edition phones
8. Addition of "App Ops", a fine-grained application permissions control system (hidden by default)
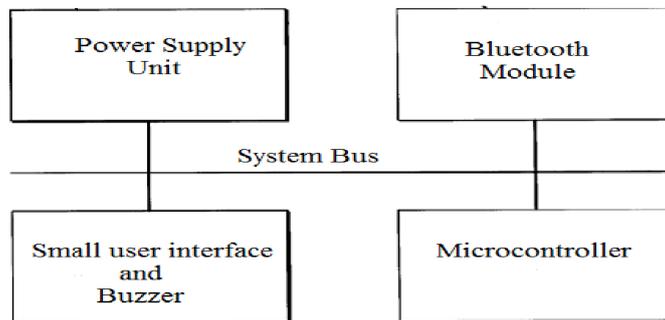
3.3 BLUETOOTH 4.0

Bluetooth technology is the global wireless standard enabling, convenient, secure connectivity for an expanding range of devices and serves. It is an essential element for bringing everyday objects into the connected world. Created by Ericsson in 1994, Bluetooth wireless technology was originally conceived as a wireless alternative to RS-232 data cables. Bluetooth

technology exchanges data over short distances using radio transmissions. Bluetooth technology operates in the unlicensed industrial, scientific and medical (ISM) band at 2.4 to 2.485 GHz, using a spread spectrum, frequency hopping, full-duplex signal at a nominal rate of 1600 hops/sec. The 2.4 GHz ISM band is available and unlicensed in most countries [5].

4 SYSTEM DEVELOPMENT OF PROPOSED SYSTEM

The transmitter is nothing but a Smartphone and receiver is a Bluetooth low energy device which is about the size of a matchbook which aims to use the community of Smartphone users to keep track of your items. It is basically android based project in which Bluetooth smart 4.0 technologies is used. And we assign a name for app is Object Finder. In this app we can click the pictures of object and when it is lost then log in to Find me app and search for object when object is in range 0f 50m then audio sound is generated & also the distance of object from smart phone is also located.
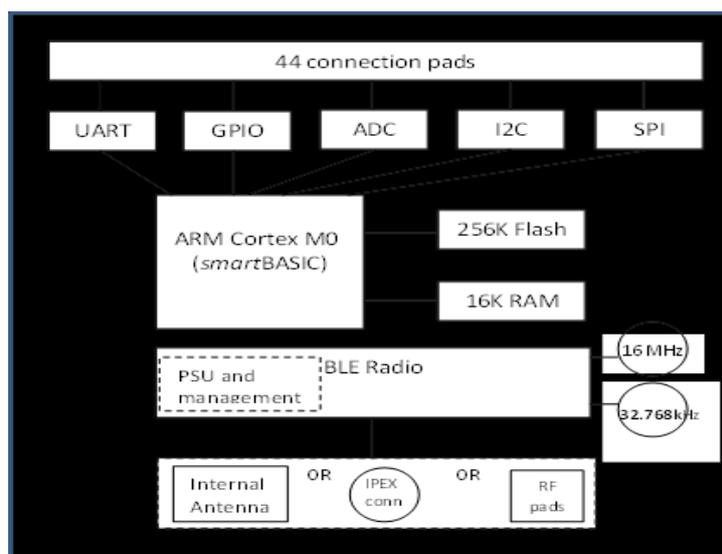
4.1 BLOCK DIAGRAM

Fig. 3. Block Diagram of Project

Android-powered Bluetooth Smart Ready devices running the latest OS will be compatible with virtually any Bluetooth enabled product—from the keyboards or headphones consumers already own, to the latest generation of power-efficient Bluetooth Smart appcessories (accessories + companion apps) like the Pebble watch. With more than three billion Bluetooth devices in the world today and all leading OS players (Apple, Android, Microsoft and Blackberry) providing native support, Bluetooth technology connects to almost anything.

4.2 BLUETOOTH MODULE: BLE112

Fig. 4 Architecture of Tag

- Hardware Features:

  1. Bluetooth low energy radio
  2. Integrated antenna, U.FL connector or RF pin
  3. 8051 microcontroller - 8 KB RAM & 128 KB flash

- Key Features:

  1. Bluetooth 4.0, single mode compliant supports master and slave modes
  2. Integrated Bluetooth low energy stack GAP, GATT, L2CAP, SMP
  3. Flexible & simple in-built development:BG Profile Toolkit™,C language
  4. Radio performance: TX power: +4 dBm to -23dBm and RX sensitivity: -87dBm to -93dBm
  5. Ultra low current consumption: Transmit: 27mA (0 dBm) and - Sleep mode 3: 0.4uA
  6. Programmable 8051 processor for embedding full applications
  7. The BLE112 modules are available with three different antenna types: integrated antenna (BLE112-A), U. FL connector (BLE112-E) & 50 ohm RF pin (BLE112-N)

5   RESULT AND ANALYSIS

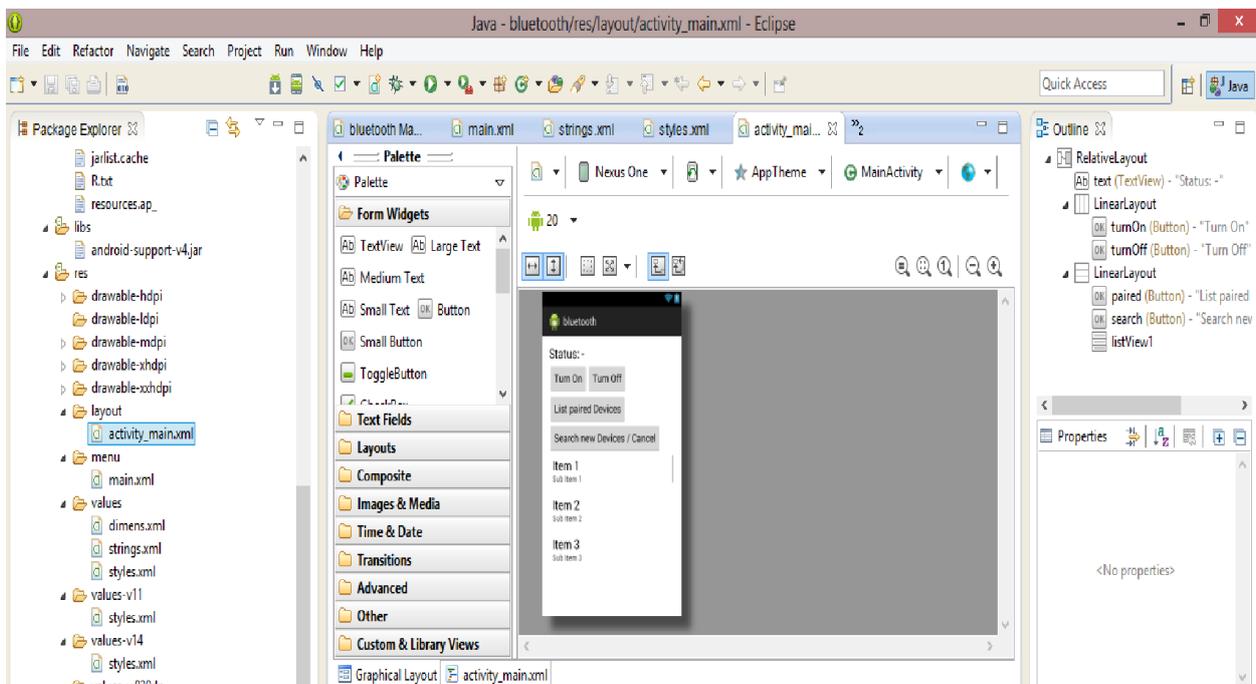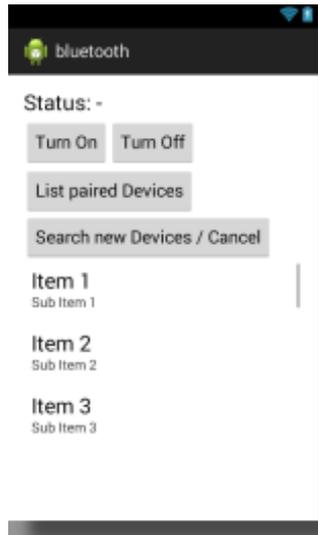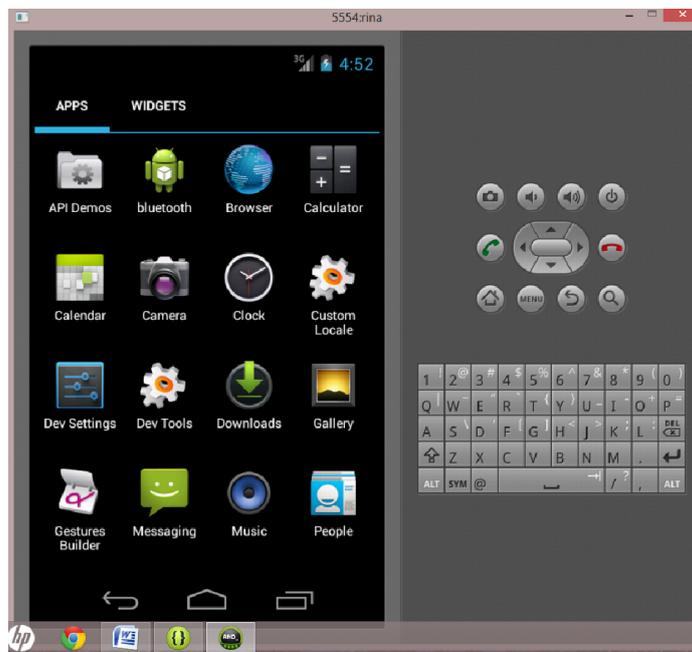1) Graphical Layout of Android App in Eclipse:

Fig. 5 android app of object finder

In our smart object finder we develop an android app which is compatible to all smartphones. This system is not limited to iOS only. The range is about 100m so it also overcome this problem of existing system in our system. Though we use android so no. of tags we can use at a time. No limitation in that. The size and weight of tag is also small with high sensitivity. The code of android app is written in Eclipse.
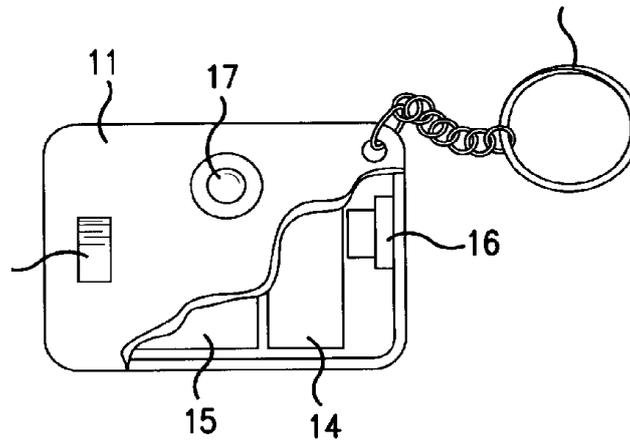
2)   Screenshot of app:

3)   Bluetooth app is launched:

4)   This app is communicate with following tag for finding object:

Fig. 6 Tag which attaches to object as keychain

6   CONCLUSION

This proposed system Smart Object Finder overcomes all the problems of existing systems. We already study comparison of existing system So, the cost point of view Smart Object Finder is much better than that because of Android app which is free of cost. The Bluetooth used in tag having inbuilt controller which reduces complexity.

6.1   ADVANTAGES

- Security of data.
- Ensure data accuracy's.
- Minimum time needed for the various processing.
- Greater efficiency.
- Better service.
- User friendliness and interactive.
- Minimum time required.
- Comparatively less price.
- Android is used as an operating system which is present in near about all smart phones.

6.2   APPLICATIONS

- For finding house hold objects and also office stuffs.
- This system will allow the user to keep track of many objects.
- This system will solve the problem of finding a specific car in car park.
- Also the problem of finding luggage on a luggage conveyer in an air port.
- Finding a specific bike in a school yard.
- Finding a person such as child in a school yard or in shopping centre.
- Finding pets.

6.3   FUTURE SCOPE

In future, an advanced object finder will release with more facilities such as finding a people or objects with their locations and distance. It will provide higher security by increasing the version of Bluetooth module with higher range and it will find the object in small amount time. The size of Tag will be reduced and it will available in less cost.

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