WILDLIFE ANIMAL TRACKING USING RFID AND GSM TECHNOLOGY

Kshama s.Bhise[1]
[1]Electronics & Communication,P.R.M.I.T.&R. email-id:kshama.bhise2000@gmail.com

Abstract-This project is used to track the location of Animal in the wildlife reserves or national parks. This project utilizes a RFID (Radio Frequency Identification Device) module and a GSM (Global System Mobile) modem for this purpose. Forest officer or Government authority person will get these SMS containing area in which that animals observe. For example white tiger, panda and many other animals. But these animals also undergo some disease or there can be some situations where human being attention is required for these animals like vaccination of these animals. If they met with some accident or are hurt then we have to cure their wounds, in such cases we need to catch those animals and do the required treatments. Main problem in such situations is that in large wildlife sanctuaries these animals are really hard to locate. Due to this many times we have to search the entire area.
Radio frequency identification (RFID) is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person wireless, using radio waves. It's grouped under the broad category of automatic identification technologies This paper is used to track the location of Animal in the wildlife reserves or national parks. This paper utilizes a RFID module and zig bee for this purpose. Forest officer or Government authority person will get these SMS containing area in which that animals observe.

Keywords: ***background, research, solution, conclusion.***

1 INTRODUCTION

This project is used to track the location of Animal in the wildlife reserves or national parks. This project utilizes a GSM modem for this purpose. Forest officer or Government authority person will get these SMS containing area in which that animals observe. Wireless networks serving mobile subscribers with fixed base stations such as cellular networks have to track those subscribers to ensure adequate service delivery and efficient utilization of limited radio resources. For example, an incoming voice call for a mobile station requires the net- work to locate that device and allocate the appropriate re- sources to handle the resulting bi-directional traffic. The network thus has to at least loosely track the device within large regions in order to make the process of finding the device more efficient. This includes handling registration of mobile station in regions as well as hand off between towers within that region. As part of its notification protocol, the network uses a broadcast medium to page mobile stations, notifying them that there is a message waiting for retrieval. There are three main entities with intended differing access to location information of subscribers; the service provider that has access to all the location data of its users, law enforcement agencies that have the ability to subpoena that information, and external entities including other users.
Cellular phones have become a communications with over 5 billion users worldwide in 2010, of which 80% are GSM subscribers. Due to their use of the wireless medium and their mobile nature, those phones listen to broadcast communications that could re- veal their physical location to a passive adversary. In this paper, we investigate techniques to test if a user is present within a small area, or absent from a large area by simply listening on the broadcast GSM channels. With a combination of readily available hardware and open source soft- ware, we demonstrate practical location test attacks

that include circumventing the temporary identifier designed to protect the identity of the end user. Finally we propose solutions that would improve the location privacy of users with low system impact.

Background

The original commercial cellular networks were deployed in the early 1980s based on analog voice, also known as 1G. To better utilize the wireless radio resources and provide better scalability, protocols for digital voice were developed. While there were multiple standards available, the Global System for Mobile Communications (GSM) [1] was widely adopted as the facto standard, now referred to as 2G. With the technology boom in the late 1990s, there was an increased interest in carrying data on wireless cellular networks. General Packet Radio Service (GPRS) was designed to utilize existing GSM networks [2], and is some- times referred to as 2.5G. Another variant of GPRS, based on a different modulation technique from GSM was also designed around the same time and would produce the Enhanced Data rates for Global Evolution (EDGE) network with higher throughput than GPRS. LTE is the successor to UMTS, whereas Wifi Max was developed independently. In parallel to GSM in the 2G networks, a service based on CDMA was built with the 3G equivalent being CDMA-2000. Those networks have not gained wide adoption outside North America. With the current focus on LTE and smart phones, there has not been much attention paid to the rest of the feature phones that make up 80% of the active subscription base for mobile phones [10]. The total number of estimated mobile phone subscribers worldwide was 5.3 billion in 2010 ac- cording to the United Nations' International Telecommunication Union (ITU) [10] and there is still a large subscriber base on GSM networks. In addition, with the recent pricing models based on data consumption, there has been an incentive for users to put their phones on networks with lower data rates to avoid accidental over-consumption.

Research Objectives and Solutions

Existing research into wireless networks for wildlife tracking has resulted in homogeneous solutions. This is the 'one size fits all' approach, where a single type of tracking device has been designed. This has segmented the solution space into animals which can be tracked using wireless networks and those that cannot, due to weight restrictions placed on the tracking collar. The objective of my research is to design a single wireless network based system that can be used to track and monitor both small and large animals. I argue that the vast diversity in the Animal Kingdom, especially with respect to body weight, should not be viewed as a hindrance, but rather something to be exploited. My philosophy is that devices with low functionality (due to weight or cost restrictions) should use the capabilities of more complex devices in order to result in a powerful network solution. The research objectives of this dissertation are:

- To design a system that is able to monitor a wide variety of animals, in a typical game park environment (areas of tens to hundreds of square kilometers).
- To make the system scalable, so it works well both on small and large numbers of nodes.
- To make the system adaptable to device insertions and removals.
- To make the system modular and flexible.
- To make the system energy conscious to maximum lifespan.
- To validate the system design with real world tests.

To address these objectives, research was undertaken in three main areas, namely in the system design of a wildlife tracking network, in the formulation of a network management protocol that can deal with large amounts of heterogeneity and in the proposal of a uniform distance sampling based approach to GPS tracking.

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GSM MODEM

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone.

When a GSM modem is connected to a computer, this allows the computer to use the GSM modem to communicate over the mobile network. While these GSM modems are most frequently used to provide mobile internet connectivity, many of them can also be used for sending and receiving SMS and MMS messages.

GSM modems can be a quick and efficient way to get started with SMS, because a special subscription to an SMS service provider is not required. In most parts of the world, GSM modems are a cost effective solution for receiving SMS messages, because the sender is paying for the message delivery. A GSM modem could also be a standard GSM mobile phone with the appropriate cable and software driver to connect to a serial port or USB port on your computer.

Fig: GSM modem

RFID PRINCIPLES

Many types of RFID exist, but at the highest level, we can divide RFID devices into two classes: active and passive. Active tags require a power source—they're either connected to a powered infrastructure or use energy stored in an integrated battery. In the latter case, a tag's lifetime is limited by the stored energy, balanced against the number of read operations the device must undergo. One example of an active tag is the transponder attached to an aircraft that identifies its national origin. Passive RFID is of interest because the tags don't require batteries or maintenance. The tags also have an indefinite operational life and are small enough to fit into a practical adhesive label. A passive tag consists of three parts: an antenna, a semi- conductor chip attached to the antenna, and some form of encapsulation.

Fig:- RFID Reader and Tag

APPLICATION

- Though RFID is not likely to entirely replace commonly used bar codes in the near future, the fol- lowing advantages suggest to additionally apply RFID for added value of identification.

- Tag detection not requiring human intervention reduces employment costs and eliminates hu- man errors from data collection.

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- As no line-of-sight is required, tag placement is less constrained, RFID tags have a longer read range than, e. g., bar codes.
- Tags can have read/write memory capability, while bar codes do not.
- An RFID tag can store large amounts of data additionally to a unique identifier.
- Unique item identification is easier to implement with RFID than with barcodes.
- Many tags can be read simultaneously, RFID tags can be combined with sensors.
- Automatic reading at several places reduces time lags and inaccuracies in an inventory.
- Tags can locally store additional information; such distributed data storage may increase fault tolerance of the entire system.
- Reduces inventory control and provisioning costs.
- Reduces warranty claim processing costs.

APPLICATION

- Wild life animal tracking — to track the animals in forest and wildlife national parks.
- We can use it for domestic purpose to detect pet animals.
- In criminal cases many times we see that police department uses dogs to find out the traces of criminals, so this project can be used in such situations

CONCLUSION

- I have shown that there is enough information leaking from the lower layers of the GSM communication stack to enable an attacker to perform location tests on a victim's device.
- I have shown that those tests can be performed silently without a user being aware by aborting PSTN calls before they complete.
- I demonstrated our attacks using cheap hardware and open source projects and showed mapping techniques to supplement cell tower databases to a granularity acceptable for our attacks.
- I finally proposed some solutions by applying low cost techniques with good anonymity properties to the GSM stack that could be implemented without hardware retrofit.
- Due to the possibility of physical harm that could result from the location leaks in the GSM broadcast messages, we are in the process of drafting responsible disclosures for cellular service providers and the technical standards body of the 3rd Generation Partnership Project (3GPP).

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