

Security Aspect for Bus Information System based on Smart Phone

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Abstract. Bus information system is one of most useful information system these days. This bus information system can be implemented with smart-phone APP easily and conveniently without big cost. This BIS system, however, has a weak point that the location information of the bus can be revised easily. For the purpose of augmenting the security aspect of the proposed BIS service, this paper explores the security aspect of the bus information system.

Keywords: BIS System, Security, Smart-Phone

1 Introduction

With the start of 21st century, the expansion and the evolution of the mobile communication started to cause the change of life style of normal people. In addition, the people's lives have been changed enormously with the invention of smart-phone, which was around the year 2010.

The smart-phone enabled us think again about every convenient system around us because it has a various abilities that can change the system without any cost. One of those systems is bus information system (BIS). BIS has been devised to provide people with the information of bus location and arrival time etc. But usually BIS requires big cost to build basic infrastructure for the service. Therefore, the small bus company or school bus system could not afford to buy BIS even though they need the system desperately. [1]

This paper introduces BIS based on the use of smart-phone and also try to deliver the solution of security matter of the system with extra equipment.

2 BIS: Bus Information System

Bus Information System (BIS), which is sometimes known as passenger system out of Korea, means a system that can provide bus information such as route, arrival time transit information to help passengers with effective transit decision. For this normal BIS services, usually huge communication infrastructure is required as in Fig. 1. [2]

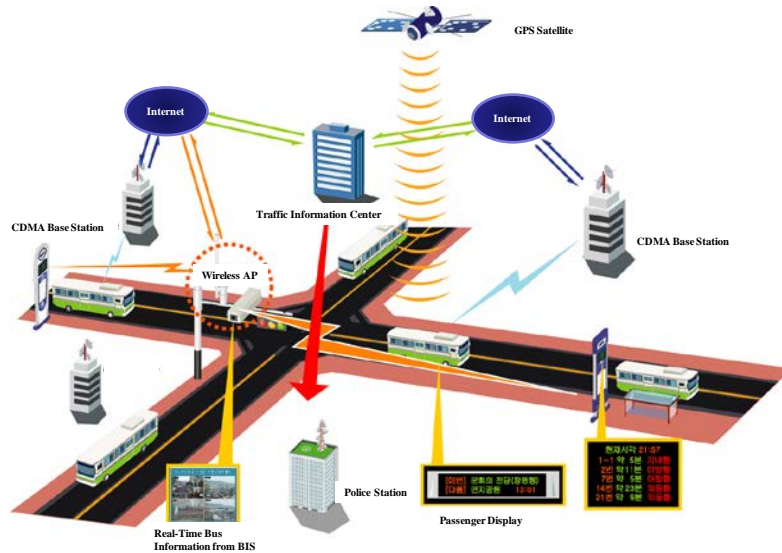


Fig. 1. Normal bus information system

This system like in Fig. 1 could enjoy many benefits of real-time BIS. However, it requires huge cost to construct the support system. Therefore, lots of small bus companies like school bus or private institute bus could not afford to provide the BIS services to the clients even though the service is required for the security reason. To provide BIS services with small cost, this paper introduces BIS based on smart-phone and explain the security matter. [3][4]

2.1 BIS service with Smart-Phone

These days smart-phone has many features like camera, GPS, many sensors and lots of other personal programs. With the some functions of smart-phone, we can simulate the BIS services. Fig. 2 shows the architecture of BIS based on Smart-phone.

As we can see in Fig.2, the proposed BIS requires the driver's smart-phone to deliver the bus location information to the local server. And passengers can find bus information like arrival time through passenger's smart phone or display panel in bus station. Since the normal smart-phone can deliver its GPS location through 3G or 4G mobile network to the dedicated server, the local server can elaborate the bus location information after collecting information from the driver's smart-phone.

For this, we need special application program for driver's smart-phone and server program. Also server needs to provide the bus information to normal passengers through Internet. Therefore, passengers can find bus information through their smart-phone or display panel connected to Internet.

To provide BIS services satisfactorily to passengers, the driver's smart-phone and the local location server are most important in BIS based on smart-phone. The driver's smart-phone has to collect GPS information from satellite when the bus is running on schedule while the designated driver is driving the bus. The driver's smart-phone

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should send the GPS information with the bus identification to local location server periodically to make sure the server follow its location. The local location server needs to provide the bus location information after collecting and processing the information from the bus. Since the information should be provide in many ways, local server should make various forms of information for passengers. Those would be normal web, mobile web, text information for bus station panel and information for smart-phone users.

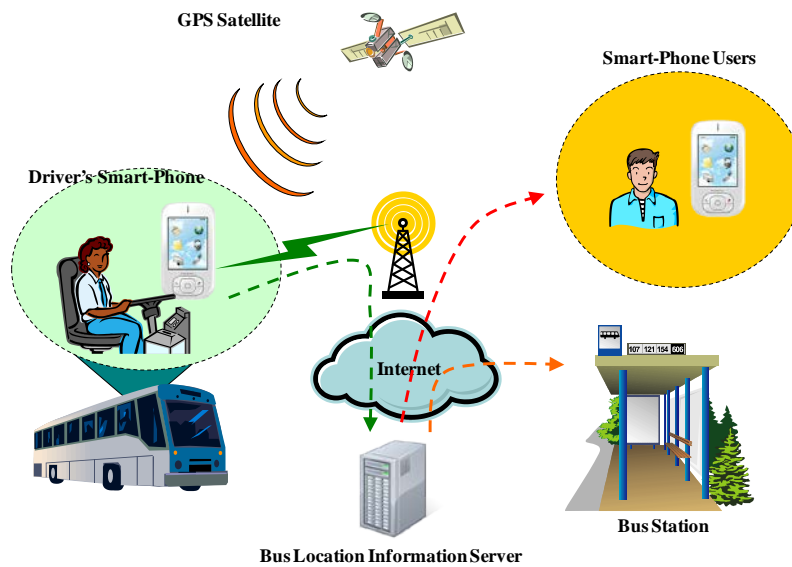


Fig. 2. Bus information system based on Smart-Phone

2.2 Security matter in bus information system based on Smart-Phone

The proposed BIS based on smart-phone has a critical problem in security aspect. The problem is that the location information of the dedicated bus is totally dependent on the driver's location. Therefore there's a case that the driver's application for BIS is operating without any thought while the driver is not driving the bus. And also the driver's application can possibly send other bus information when the driver changed the bus.

To prevent those malfunctioning case and augment security aspect of the proposed BIS, we need the security augmenting scheme for BIS based on smart-phone.

3 Security Consideration for BIS

To make sure that the information of bus location is only sending to the server while the driver is driving the dedicated bus, we need to consider security aspect of the proposed BIS.

The proposed BIS is getting the location information of the bus from driver's smart phone. Therefore the application working on driver's smart phone should wake up when only the driver is driving the bus. And the application in driver's smart phone should go sleep when driver stops driving.

For this we need special scheme to secure the BIS based on smart phone apps.

4 Conclusions

This paper has introduced the new bus information system based on smart-phone. Since the smart phones are multi tasking and very resourceful these days, we can replace many usual expensive systems with APPs in smart phones. The same idea has been adopted in the proposed BIS. But the proposed BIS has the security problem that could create serious problem when it is used in real situation. To prevent this security problem, the security augmenting scheme is very necessary. Further study is required to make the security system for BIS with smart-phone apps.

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