

## M-Brochure

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### Abstract

*Tourism industry is one of the important sources of income in many countries. The appropriate and quick submission of primary information such as address of hotels to the tourists is very effective in attracting them. On the other hand today many people use mobile phone and carry it as a necessary device. As a result to submit information to tourists we can send information to their mobile phones instead of using paper brochures. We have named this idea M-Brochure which is the abbreviation of Mobile Brochure. To this end, we must place computers equipped with Bluetooth and infrared communication systems in airports to distribute brochures, maps, and other items of information required by users as mobile programs. A tourist can receive the necessary information by connecting his/her mobile phone to one of these computers and by receiving and installing the concerned programs.*

*This project has been implemented by J2ME (Java 2 Micro Edition) programming language on a Nokia mobile phone, model 6680 and using a laptop computer supporting Bluetooth and Infrared connections.*

### Keyword

*Brochure, Bluetooth Technology, Infrared, Mobile Phone, Tourist.*

### 1. Introduction

Tourism industry is an important and money-making profession in many countries. By attracting tourists from all over the world, most countries try to promote cultural and political conditions of their countries besides gaining income. Consequently they advance the determining factors of tourist attraction. Among these factors we can point to reconstruction of the archaeological sites, creation of tourism attractions such as parks, providing appropriate facilities such as good hotels and restaurants, presentation of such

adequate information to tourists such as various city maps and facilitation of possibility of travel to their countries. Of course these factors have undergone some changes and variations in accordance with technology advances and development of people's behavior in course of time. For example one of the very significant services for tourists is access to and availability of Internet facilities through places such as cafe nets. As a result tourism industry should also adapt itself with these changes and developments and advance and develop its services in order to be successful in attracting tourists.

As we pointed out earlier in this paper, presentation of adequate and sufficient information to tourists is an important factor in attracting them. Among these measures, we can mention distribution of guiding pamphlets in airports. In these brochures we can present information items such as maps of cities and addresses of various hotels, parks, restaurants, important phone numbers, etc. These brochures are put at the disposal of tourists freely and in a large volume. But these brochures have some disadvantages, too. We cannot place all the available information in these brochures. For example, although we can show the place and address of hotels on a map and even specify some of the facilities such as hotel capacity and its rates, showing a great deal of information is not possible and we cannot show some other items such as the number of free rooms changing all the time either. On the other hand, carrying so many brochures tires and dissatisfies tourists.

To overcome these difficulties some solutions have been presented. For example in the airports of some countries they have placed touch screen computers and tourists can search city hotels and get information such as hotels' addresses, their rating, capacity, and number of free available rooms. This method also has a problem that is impossibility of permanent access to these information items because the only place where we have access to these computers and get required information is airports.

One of the devices which have been used in a widespread way along with technology advances is mobile phone. Today people consider their mobile

phones as a very necessary device and the majority of people carry them wherever they go. As a result using this device can be an appropriate choice for presenting services to tourists.

However, during recent years, the tourism industry has taken notice of using mobile phones and a lot of work is done in this field. Most of these methods are for providing information about the current location of tourists by mobile phone and guide them to find places and routes in online mode. In the next section we will review some of these methods.

Bluetooth technology can be briefly defined as a standard of short-wave radio frequency for wireless connection of such devices as Pocket PCs, mobile phones, and desktop computers. This technology works with 2.45 Giga Hertz frequency (Figure 1) and covers a scope up to 100-meter distance with the maximum transfer speed of 3 Mbits per second (in Bluetooth 2 standard). A Bluetooth device can be connected to 8 appliances at the same time [1].

It was primarily designed as a cable replacement technology. Bluetooth has become increasingly popular in modern mobile phones with an estimated 24 million Bluetooth-enabled in use in 2002 [2].

Currently, with mobile phones, its main use is for the connection of hands-free devices (Figure 2) or for communicating with desktop computers. Today, a great number of the mobile phones supports Bluetooth and we can build low cost multi-user personal area networks by using Bluetooth [3].

In this paper a method has been presented for giving information to tourists through mobile phones instead of paper brochures at the airports. We call this method M-Brochure which is the abbreviated form of Mobile-Brochure. In this method computers supporting with Bluetooth or Infrared connection are placed at the airports. On these computers information such as maps are placed in the format of mobile programs.

Tourists can receive and install these programs by connecting their mobile phones to these computers through Bluetooth and Infrared. Therefore the information required by tourists is saved on the tourists' mobile phones instead of printing paper brochures.

We have explained the details and method of its implementation in section 3.



Figure 2. A Nokia Bluetooth headset [4].

This way, we can decrease the expenses of printing paper brochures. On the other hand, it would be possible to update information continuously through connection of tourists' mobile phones to the center of tourism information presentation.

In the final section of this paper we deal with the advantages of this method and ultimately we make the final conclusion.

## 2. Related Works

In recent years and after warm welcome of people to mobile devices, different methods for using these devices in the tourism industry are proposed. Most of these methods aimed to help tourists to find desirable places, propose best route to reach that place, and give information about that place. In these methods, information is delivered online through mobile devices such as mobile phones and PDAs (Personal Digital Assistants).

For example in the Kawasaki's method [5], when the tourists reach a certain place, information about that location is sent to their PDA automatically (Figure 3). However, there are some concerns about the quality and security of this method and some solutions for that are proposed.



Figure 1. Radio Frequency used in Bluetooth technology [3].

CRUMPET project [6], which is supported by EU, is another service to give information to tourists through mobile phones. But this is a Value Added method and has costs for user.

In some methods, the information isn't send to user automatically. For example in the method proposed by Pashtan [7] tourists can connect to the information center through web services such as WAP to acquire information (Figure 4).

Some countries start to use such systems in their tourism industry. For example in Australia, the mobile phone is used to give information to tourists with a system called LBTS [8].

The use of mobile phone in tourism industry isn't limited to above methods and has other usages. For example in DTG (Digital Tourism Guide) system [9], a mobile agent is used to design a tour. In this system, information is given in audio format.

In spite of methods which are mentioned above, our main goal is to give tourists information which they usually carry with them in print form, like maps, dictionaries, city information such as emergency phone numbers and etc. In addition, it is possible to update information such as hotel status and weather forecasts. Among these methods, OISTI method [10] is similar to our proposed method. That method gives information to vehicle drivers and passengers. In our method, the information is stored on user's mobile phone and be updated by connecting to the information center. Similar to our method, information is saved in a database inside vehicle and mobile phone is used to update information.

In that method, a computer which equipped with a GPS to locate vehicle locations, is places inside the vehicle. And the necessary multimedia information is stored on CD or DVD. In that system the information is given to driver orally and he/she can command the system with voice commands during driving (Figure 5). Also, in our method, it is possible to give information orally or use multimedia information, but it requires advanced mobile phones. However, in OISTI method, the emphasis is on locating features, so it isn't completely similar to our proposed method.

### 3. The Suggested Method

The goal of our method is to present information which are available in the brochures through mobile phones. In fact our goal is to present information digitally instead of traditional methods which are dependent on paper. Of course, this method is not limited to presentation of the available information of brochures and has more widespread applications to which we will point afterwards.



(a) PDA appearance

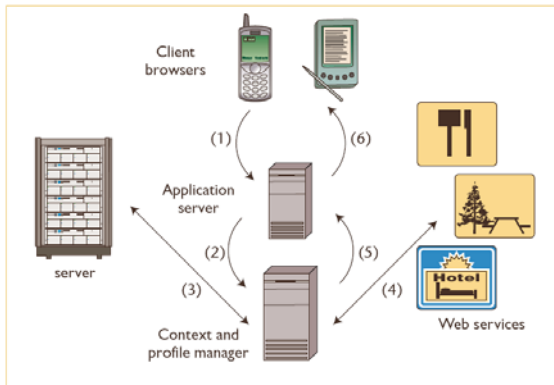


(b) Notification around the tourist spot



(c) Tourist spot guide

Figure 3. Appearance and screenshots of tourist information on a PDA [5]

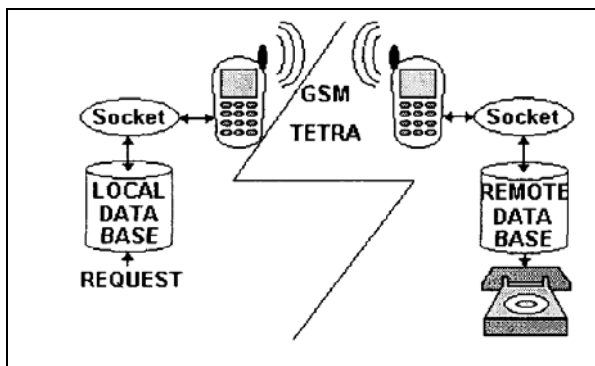


**Figure 4.** Architecture of a web-based tourist information system [7]

To present the available information of brochures on mobile phones, at first we prepare the information on a computer. Then we modify it to show it on mobile phones. One of the available methods to do this is converting paper brochures to documents with current computer formats such as Word or PDF. But this way it is difficult to update the documents. On the other hand, it is impossible to have some useful features such as using a map to find the address of a hotel or finding the shortest way to reach a hotel. Therefore we should design a specialized program to present the necessary information through mobile phones.

As a result, we cannot create a program similar to the available programs on computers, for mobile phones. It must be noted that we cannot use the similar available programs on computers, in mobile phone. The reason is because mobile phones have some limitations such as their small screen and lack of keyboard or limitation of their small keyboard.

In experimental and tentative implementation of this method, we have used a ready map program but to enhance the abilities and facilities to match the requirements of tourists we should design a specialized program in future implementations.



**Figure 5.** Databases & Communication systems for a tourist information system [10]

Because of the differences between present mobile phones, maybe we will need a separate distinct redesign of our specialized program for various mobile phones. Of course, we have written the program in J2ME (Java 2 Micro Edition) programming language which is a special version of Java for mobile phones, in order to make it portable to a great variety of mobile phones because most of mobile phones support Java programming language.

The next step will be sending programs to recipients' mobile phone. To do this we should place computers supporting Bluetooth and Infrared at the airport. The reason for their being equipped with these two connections is the ability to connect to different models of mobile phones.

Bluetooth is a technology enabling users to create Wireless Personal Area Networks (WPANs); allowing a range of devices to communicate in a local area without wires. Operating in the Industrial, Scientific and Medical (ISM) band at 2.45GHz (Figure 1). The main advantages of Bluetooth are its low power and cost, and its ability to give high connection reliability in a crowded area of the spectrum. Bluetooth devices are currently available in three power bands. Bluetooth has a maximum range from 10m to 100m. To minimize any interference, Bluetooth devices use 79 channels within the ISM band, occupying 1 MHz each. Frequency hopping is used, with a nominal rate of 1600 hops per second. Bluetooth supports up to 3 synchronous voice channels at 64kb/s each way and asynchronous data at up to 723.2 kb/s asymmetric or 433.9 kb/s symmetric [2].

Most important advantages of Bluetooth are its wireless characteristic, low costs and its being automatic.

Infrared Radiation (IR) is electromagnetic radiation of a wavelength longer than that of visible light, but shorter than that of radio waves. IR data transmission is also employed in short-range communication among computer peripherals and personal digital assistants. These devices usually conform to standards published by IrDA, the Infrared Data Association [11].

IrDA standard designed for communication between devices (such as computers, PDAs and mobile phones) over short distances using infrared signals. The first IrDA standard made preparations asynchronous data communications at rates up to 115.2Kbps and synchronous communications at 4Mbps. This standard is now formally known as IrDA-Data [12].

Connecting through USB ports is very difficult despite its high speed because it needs a direct connection through cable and is not suitable for places such as airports.

Right now, other wireless standards are being developed which are far quicker than Bluetooth and can cover a larger area. A sample of these technologies is Wi-Fi wireless standard which have been implemented even on mobile phones recently. Wi-Fi is a limited-range wireless networking protocol based on the 802.11 family of standards; uses spectrum in the 2.4 GHz range to exchange data at broadband speeds. Therefore we can enhance the advantages of these systems through replacing Bluetooth with these standards. However these technologies need advance mobile phones, so we do not use them in our project.

The task of the concerned computers is to send the programs and information to mobile phones. To this end the tourist connects his/her mobile phone to one of these computers through Bluetooth or Infrared. The computer will send the relevant programs and information in accordance with the mobile phone model to the tourist's mobile phone.

It is not necessary to take the mobile phone near the computer. As we said earlier, the Bluetooth has a maximum range of 100m.

In experimental implementation of this project, we designed programs for a Nokia 6680 mobile phone. Then we sent these programs through a laptop computer equipped with Bluetooth and Infrared communication systems and through Bluetooth port to the Nokia 6680 mobile phone. At present in this project the tourist receives his/her required information by installing and running these programs on his/her mobile phone.

The concerned computers which are designed to be places at the airports can be connected to the Internet in order to receive the latest information around the clock and to update the programs in accordance with the received data. Furthermore programs installed on the tourist's mobile phone can receive the latest and most updated information (such as the number of free rooms in hotels) by connecting to the Internet.

Through this method, we cannot only send the tourists available information mentioned in brochures such as maps, important phone numbers, and current events, but also we can put at the disposal of tourists some applications such as a dictionary installed on mobile phone which we can not present through a brochure.

In experimental implementation of this method we sent an English to Persian and Persian to English dictionary, a program for currency exchange, and an Iranian calendar to the mobile phone (Figure 6).



**Figure 6.** An screenshot of running Iranian calendar on a Nokia 6680 mobile phone

#### 4. Conclusion

Today, a lot of information is distributed through brochures. This paper presents a method for delivering this information through mobile phones. In this method computers equipped with Bluetooth and Infrared connections will be placed at the airports and then on these computers we place the programs containing required tourism-related information which are mentioned in the paper brochures.

At first the tourists connect their mobile phones to one of these computers and after receiving and installing programs they can receive their needed information by the execution of these programs.

As mentioned earlier, we can update and present the information required by the tourists all the time while after printing the paper brochures we cannot update them easily. On the other hand, this method decreases the costs of paper brochures printing and distribution.

This method is not limited to tourism industry and can be used in other places. For example we can transfer necessary information in historical sites to the mobile phone of visitors. With this information, there is no need to send a tour guide with tourists.

Our suggested method is not limited to tourism industry, for example it can be used for presentation of the necessary information to the visitors of an exhibition. This method can be used in PDA's and notebooks as well. On the whole, this method can be implemented for wireless devices. For example, some handheld console games such as PSP (PlayStation Portable) and Nintendo DS are WiFi enabled. Therefore we can develop the programs for these consoles and tourists can download the programs on their consoles. In Figure 7 you can see an screenshot of AMAP4DS (A Map for DS), a map viewer designed for Nintendo DS console [13].

Although it is possible to send the programs to mobile phones through the Internet, due to certain difficulties for example low speed of Internet connection through mobile phones in some countries and the more difficult method of connection through the Internet in comparison with the Bluetooth and Infrared connections, it is not recommended.

This method cannot be used instead of paper brochures at present because some people don't have a mobile phone and some mobile phones lack the ability of connection through Bluetooth or Infrared systems. Some of mobile phones can only connect to the Internet via GPRS facility, but this facility has its own difficulties. As a result, in this condition our suggested method can supplement and complete the performance of paper brochures.



**Figure 7.** An Screenshot of AMAP4DS (A Map for DS), on a Nintendo DS Console

## 5. References

- [1] Bluetooth SIG, Specification of the Bluetooth System, Version 2, November 2004, [http://www.Bluetooth.com/NR/rdonlyres/1F6469BA-6AE7-42B6-B5A1-65148B9DB238/840/Core\\_v210\\_EDR.zip](http://www.Bluetooth.com/NR/rdonlyres/1F6469BA-6AE7-42B6-B5A1-65148B9DB238/840/Core_v210_EDR.zip), (last accessed: April 25, 2008).
- [2] P.D. Garner, "Mobile Bluetooth networking: technical considerations and applications", Proceedings of the 4th International Conference on 3G Mobile Communication Technologies, 25-27 June, 2003, pp. 274-276.
- [3] J. Layton and C. Franklin, "How Bluetooth Works," How Stuff Works, <http://electronics.howstuffworks.com/Bluetooth.htm> (last accessed: April 25, 2008).
- [4] Nokia, Nokia Cellular Phone, <http://www.nokia.com> (last accessed: April 25, 2008).
- [5] K. Kawasaki, et al., "Wireless Ad-hoc Network-Based Tourist Information Delivery System", Proceedings of the 20th International Conference on Advanced Information Networking and Applications (AINA'06), 18-20 April 2006, pp. 138- 142.
- [6] S. Poslad, et al., "CRUMPET: Creation of User-Friendly Mobile Services Personalised for Tourism", Proceedings of the Second Int. Conf. on 3G Mobile Communication Technologies, 26-28 March 2001, pp. 28-32.
- [7] A. Pashtan, A. Heusser, and P. Scheuermann, "Personal Service Areas for Mobile Web Applications", IEEE Internet Computing, Vol. 8, No. 6, pp. 34 – 39, November.-December 2004.
- [8] P. Hawking, et al., "Emerging Issues in Location Based Tourism Systems", Proceedings of the International Conference on Mobile Business (ICMB'05), pp. 75 – 81, 11-13 July 2005.
- [9] K. Hagen, M. Modsching, and R. Kramer, "A Location Aware Mobile Tourist Guide Selecting and Interpreting Sights and Services by Context Matching", Proc. of the Second Annual International Conference on Mobile and Ubiquitous Systems: Networking and Services (MobiQuitous'05), pp. 293 – 301, 17-21 July 2005.
- [10] M.A. Losada, et al., "OISTI (An Oral-Interface System to provide Tourist-Information inside a car)", Proceedings of the International Conference on Information Technology: Coding and Computing, pp. 373 – 377, 2-4 April 2001.
- [11] Infrared Data Association, IrDA Data Specifications (SIR/MIR/FIR/VFIR), <http://irda.org/displaycommon.cfm?an=1&subarticlenbr=69>, (last accessed: April 25, 2008).
- [12] R. Casanova, et al., "A Specific Integrated Controller for Nanomicroscopy and Cellular Manipulation", Proceedings of the IEEE International Symposium on Circuits and Systems (ISCAS 2005), Vol. 1, pp. 141-144, 23-26 May 2005.
- [13] C. Andréani, AMAP4DS (A Map for DS), <http://www.andreani.net/ds/amap4ds.htm>, (last accessed: April 25, 2008).