INVESTIGATION ON THE CONCEPT MODEL OF MOBILE GIS

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Abstract:

Today, we hear more Mobile, and find some mobile GIS application in our everyday life, such as GPS car management However, what is mobile GIS? What is the difference among Static GIS and Temporal GIS? This seems to be the first step to study mobile. The paper, it gives the concept of mobile GIS, the system Architecture of Mobile GIS, the key research area in mobile.

1 Introduction

With the development of computer software and hardware, as well as the application of WAP successfully in wireless network, and the emergence of intelligent terminals, such as PDA and WAP phone etc., People owing these intelligent terminals can do their work on the spot at any time or anywhere, which they have to do in their office or home before. That is to say, they can “do their work on the move”. In the meantime, apparatus such as GPS, GSM model made for the intelligent terminals have extended the application region of it. The integrated system of the intelligent terminals with GIS, GPS and wireless network has become a new research area in the field of GIS and navigation. In the GIS field, the integrated system was called mobile GIS. Although the word “mobile GIS” has been proposed before, the concept model of mobile GIS is far from being defined clearly.

Since mobile GIS is a very new research area in GIS, the concept model of it is vague. In recent years, many researchers distributed all over the world focused their energy on it. It is also attracted our attentions. According our experiences and the research results that have made in mobile GIS, the concept model of mobile GIS was proposed and introduced in this paper.

2 What is Mobile GIS

Traditional GIS mainly does research work on static spacious entity. We call it Static GIS. The analysis space of Static GIS is *(Postion, Attribute)*.The research object is spacious entity. As for static GIS does not involve, it can not depict the character of the nature of the moving world, for example, Static can hardly record the change of a piece of field, such as the change of the boundary of the field, or the owner of the field.

In 1988,Langran and Chrisman put up the concept of Temporal GIS. We call it TGIS. The research object is moving spacious entity. TGIS adds a new dimension time in its analysis space, or *(Position, Attribute, Time)*. It seems that TGIS will solve the dynamic state of the spacious entity. Though many work have been done on TGIS, right now, the data model of TGIS is still under research..

Both SGIS and TGIS do research work on spacious entity. In GIS spacious entity refers to an entity which has geographic aspects, such as road, mountain, building, etc, in the meantime spacious entity does not include no- geographic entity, such as a car, a desk, or a book and so on.

Today, we hear more about mobile GIS. What is mobile GIS? What is the research object of mobile GIS? Here, we give the concept of Mobile GIS:

Mobile GIS is a kind of GIS, it does main research work on no-geographic moving object in geographic space, it do research work on the relationship between moving object and geographic entity, or moving object between another moving object. For an example, we can integrate GIS, GPS, wireless internet to build a mobile GIS to monitor cars. We study the moving car in geographic entity space, moving car is no-geographic entity.

3 General System Architecture of Mobile GIS

A mobile GIS is composite of a mobile client, a server, a wireless network, a mobile client position record system,

such as GPS.

A mobile client can be a moving car equipment with GPS and GSM model which can get and send the geographic position to the server by SMS, or a man takes PDA, such as Palm or windows CE which equipped with GPS, the PDA can show the digital map and can comminute with the back support server by wireless network.

A wireless network can be GSM, CDMA, CDPD or GPRS, which support digital data transmitting.(See the figure)

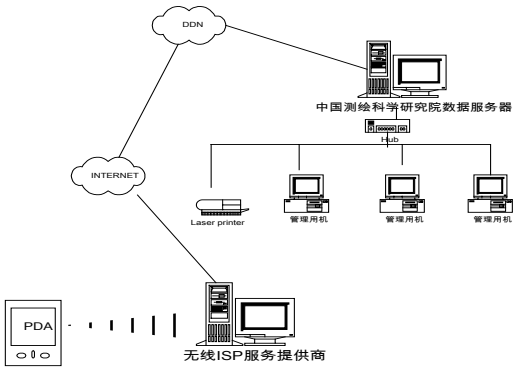

Figure 1 A typical system artichture of a mobile GIS

4 Key research area in Mobile GIS

As for mobile GIS is new research area, the following area will be mobile key research Devices that combine a hand-held computer with a GPS receiver, a cellular phone, and a digital camera will enable users to integrate spatial analysis into their daily lives, opening GIS to the mass market. We currently lack the theory necessary to tackle in real time very large volumes of spatio-temporal data in a highly-distributed computing environment. This research topic covers cognitive aspects about the interaction with Mobile GISs; spatio-temporal information in a highly distributed computing environment; and the integration and interoperation of multi-modal spatial information (such as voice, graphics, image, and video).

4.1 The data model for mobile client side in Mobile GIS

The live world is very complicated, and the people hope that the GIS include enough data to meet their demands, at the same time, they also always want to discard the data, which they do not care about (Freksa and Barkowsky, 1996).

The intelligent terminals that are used for mobile GIS hardware platform are with lower CPU speed than PC, limited externals storage and small size display screen. In general, it's hard to display map on them if we just take the normal method that we use in personal computer or workstation. Concerning about the characteristics of these intelligent terminals, a different or new line compared with traditional GIS must be taken on mobile GIS.

4.2 The mobile computing model for Mobile GIS

As for mobile client usually has limited CPU speed, many computer works such as query some place should be place to the server side. How to co-operate to finish the distributed work in wireless network environment will be a challenge in this area.

4.3 The database structure to store moving object data

To store the moving data of a moving object will cost many space in computer, today there are is not a suitable database to store moving and changeable data. The Mobile Object Database will be a research in this area.

4.4 The realization of query moving object and analysis moving object

Query and analysis are the basic function of GIS, mobile GIS's query of deal with finding the moving object, or track a moving object etc.

5 Conclusion

As for Mobile GIS is a new subject in GIS, this paper presents the basic of mobile GIS, however this is the first step in studying Mobile GIS. Further, I will present the design of mobile GIS data model

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