

POI searching system using PDA

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Abstract: Recently, Location-based services(LBS) allow consumers to receive services based on their geographic location data. Users want to take services based location information with portable devices. And Point of Interest(POI) information's usage is increasing with mobile device's development and user's interest. And this paper shows that we connect the multimedia POI database(DB), provide the multimedia services through the portable devices and search POI using location and direction information. The multimedia POI is consisted of sound, image, moving image and animation with location information. When we search POI, we find POI in DB using the area zone and direction information.[1]

Keywords: LBS, POI, multimedia POI

1. Introduction

POI searching services are used through Java based XML(extensible markup language) message without the platforms. And this system support several standard protocols(SMTP, HTTP, and FTP). We implement a POI searching system which was supported multi-platform. The implemented system in this paper is POI searching service based Java codes. Basically we implement on based OpenLS directory service. This system consists of PDA, camera module, electronic compass and tilt sensor. According to the electronic compass, we rotate vector map in device's direction and search POI. The POI searching system's problems are as follows, animation in multimedia POI is not implemented, but in the future we will complete the POI searching system supported animation.[2]-[5]

2. POI System

1) Structure

Clients request the service through XML documents consisted in pre-defined format. In the server side, we response the result of server's processing of input request. So, Clients should be sent message without platforms. In this paper, POI searching system defined based POI information retrieve and store both the location and the multimedia contents such as image, sound, moving image and so on.

Fig. 1 shows POI based multimedia contents client-server structure. When clients send service request of encoding data, server receives request XML data, decodes it, connects POI multimedia DB, processes POI storing or searching, and returns XML data of processing result. Then, clients receive service response by SOAP(Simple Object Access Protocol) through the wireless network and display response result. Fig. 2 shows the simple flowchart of the multimedia contents service. If we request a format fit to POIStoreRequestADT, server responses a well-formed data for POIStoreResponseADT schema. Also, if we send POISearchRequestADT formatted data, returns data fit to POISearchResponseADT through PDA device.[7]

2) Use Case Requirements Analysis

This system service provides the searching and storing system of multimedia contents,.

The requirements are that:

1. Clients send to DB the acquired multimedia contents
2. Server returns the true or false of the storing process success of being sent multimedia contents.
3. Clients could be provided searching the multimedia contents to satisfy requirements.

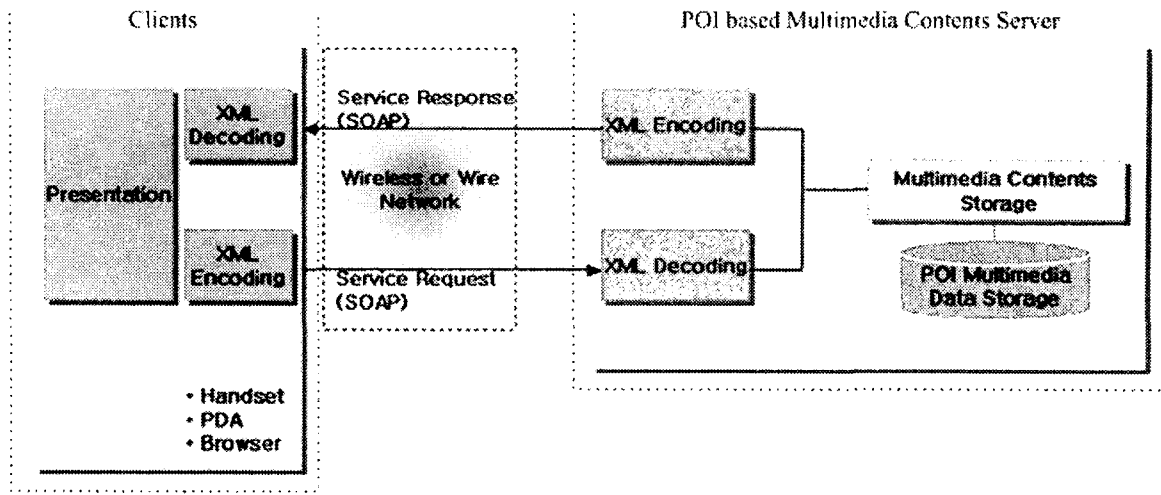


Fig. 1 POI based multimedia contents client-server structure.

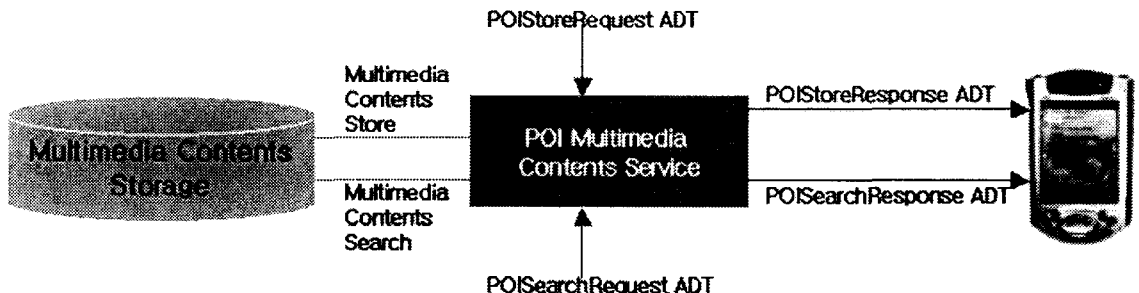


Fig. 2 The simple flowchart of the multimedia contents service.

- 4. When more results than two for clients' requirements are existed, it could be returned the list of result.
- 5. We display response the accuracy to the clients' request.

3) Sequence Diagram

Fig. 3 shows the sequence diagram of POI storing request procedure. User requests the poiStore function to the POIContentsService, returns POIStoreResponse. Fig. 4 shows the sequence diagram of POI searching request procedure. User requests the POISearch function to the POIContentsService, returned POISearchResponse.

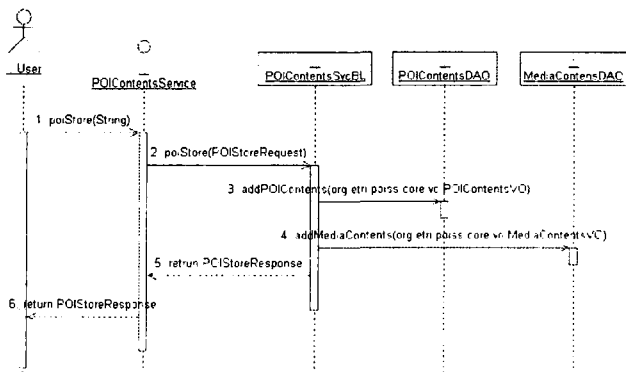


Fig. 3 POI contents storing request procedure

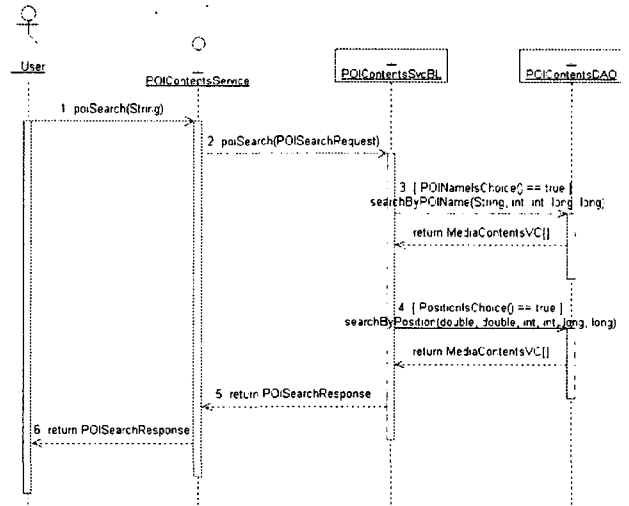


Fig. 4 POI contents searching request procedure

POI searching method

POI searching method is used two simplifications. One is constant angle simplification method and another is rectangle simplification method. Constant angle simplification method has constant angle and two lengths.

θ is POI angle. l_1 is minimum distance, and l_2 is maximum distance in Fig. 5. And rectangle simplification method is used two angles and two lengths. $\theta_1,$

θ_2 is POI angle, l_1 is minimum distance, l_2 is maximum distance in fig. 6.

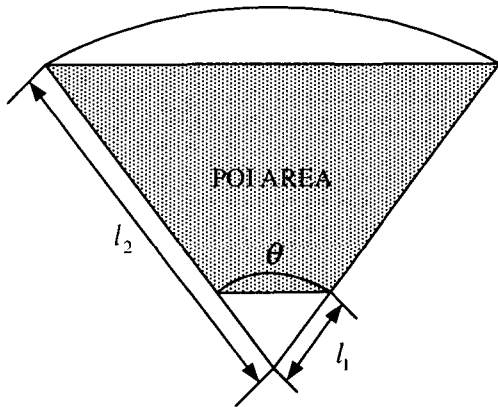


Fig. 5 Constant angle simplification method

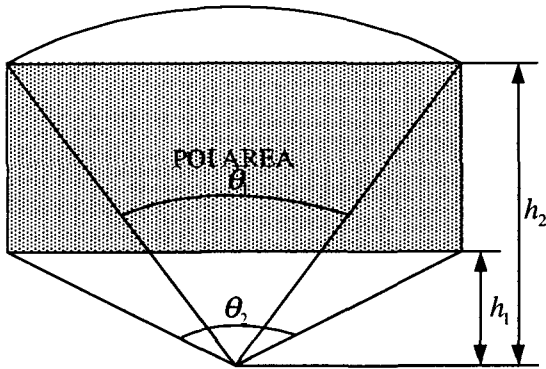


Fig. 6 rectangle simplification method

4) Class Diagram

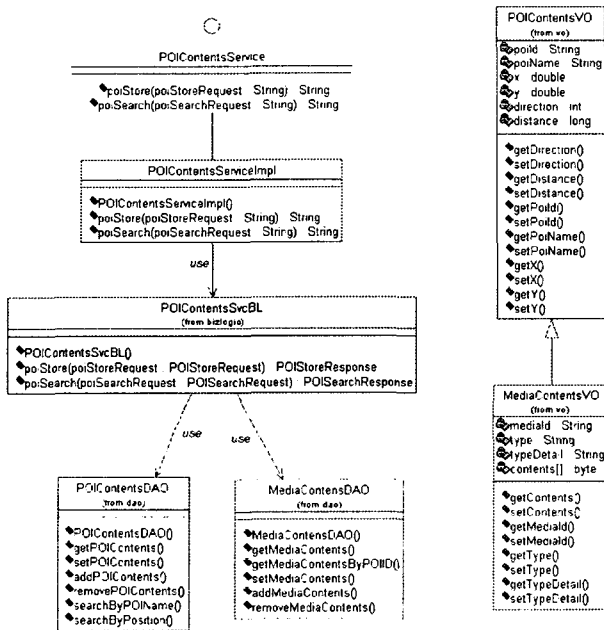


Fig 7 POI Searching system class diagram

This system consists of POIContentsService interface,

POIContentsService implementation class, POIContentsService business logic class, POIContentsDAO, MediaContentsDAO and so on. And POIContentsService Class is interface class that defined function to store and search multimedia contents such as sound, image, and moving image for POI information acquired in mobile device.

5) Implementation

We implements that PDA system based POI storing and searching function. And implementation specification is as follows.

- Implementation Specification
 - Web Server:
 - IBM WebSphere Application Server
 - Developer language : JAVA 1.4
 - Web Service Development Toolkit:
 - apache axis
 - Used library: JAI(Java Advanced Image)
 - Client environments
 - ❖ PC : Web Browser
 - ❖ PDA : PocketPC2003
 - PDA Client developer : .NET 2003

Fig. 8 shows POI searching system flowchart. It consisted of the parameter input, POI searching setup, DB connection, POI searching criteria, and result display. Parameter input has literal xml values parameters input of OpenLS extended specification. POI searching setup has POI multimedia contents, searching area data, location, direction and distance information. DB connection and POI searching criteria has DB connection with spatial operation and searching requirements. Result display is POI result display using PDA.

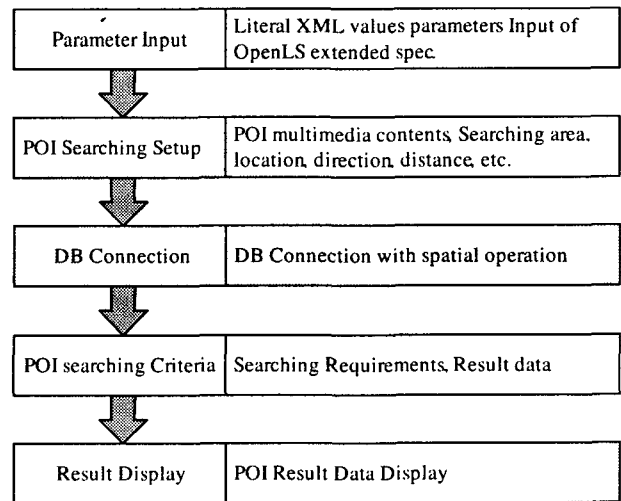


Fig. 8 POI Searching system Flowchart

Fig 9 shows POI searching system main display and POI searching system map display using PDA, its system display has .NET framework and used in Korean language.[6]

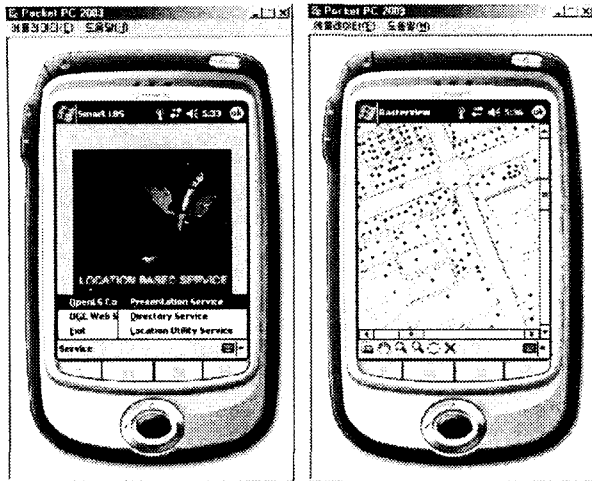


Fig. 9 POI searching system display

3. Conclusions

In this paper, we implemented POI searching and storing system using PDA. In based OpenLS Core services, we extended it. And easily we used POI storing and searching function. in general, POI searching system has not electro-magnetic sensor, tilt sensor, and camera modules, but we implemented with these using PDA.

In the future, we will develop the system used in mobile device with direction sensor and tilt sensor and will complete the POI searching system supported animation as soon as possible.

References

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