A FRAMEWORK FOR INTEROPERABLE LOCATION BASED SERVICES APPLICATION DEVELOPMENT ON MOBILE DEVICES

Thudugala Mudalige Thushari Nimalika Fernando

(08/8031)

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Department of Electronic and Telecommunication Engineering

University of Moratuwa

Sri Lanka

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Abstract

A key limitation in the present generation of Location Based Services (LBS) applications is the lack of interoperability in terms of the data sources they utilize and the devices they run on.

As most LBS applications are commonly bound to a specific high-end mobile platform, they fail to run on mobile phones which use other platforms. Even though two thirds of the world population use feature phones, the majority of available LBS applications cater only to smart phones which are used by the remaining one third. Many LBS applications are also bound to a single map data provider and they have limited facilities to use already available geographic data in local contexts or at individual level.

In order to address the above interoperability issues, a framework which can be utilized to generate LBS applications interoperable in terms of the devices they run and the data sources they use is proposed in this research. The interoperability related to map data is achieved by using map servers compliant with Open Geographic Consortium's (OGC) Web Map Service (WMS) and Web Feature Service (WFS) based map servers via a Cascading Map Service. The interoperability related to devices is achieved by using a mobile web based approach. The key contribution of the research presented is a mechanism to generate LBS applications which are interoperable in these two contexts.

The proposed framework is implemented using web technologies. Four sample LBS applications which make use of data from six map servers implemented using two different technologies are generated as a proof of the concept. Six different mobile phones which range from feature phones to smart phones are used for testing. Results indicate that the interoperability related to map data and devices can be achieved using the proposed approach. The framework can be used to generate interoperable LBS applications targeting the general public as well as for specific domains, for example management of resources of public utilities.

Keywords : interoperability, Location based services, OGC

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LIST OF ABBREVIATIONS

General Abbreviations

Abbreviation	Description
ADT	Abstract Data Type
CRS	Coordinate Reference System
EPSG	European Petroleum Survey Group
ESRI	Environmental Systems Research Institute
GIS	Geographic Information System
GPRS	General Packet Radio Service
GPS	Geographic Positioning System
GSM	Global System for Mobile
HTTP	Hypertext Transfer Protocol
ICCAN	The Internet Corporation for Assigned Names and Numbers
ICT	Information and Communication Technology
J2ME	Java Platform Micro Edition
LBS	Location Based Service
MMS	Multimedia Message Service
MIT	Massachusetts Institute of Technology
NASA	The National Aeronautics and Space Administration
OGC	Open Geospatial Consortium
OMA	Open Mobile Alliance
OpenLS	Open Location Service
OWS	OGC Web Map Servers
PDA	Personal Digital Assistants
POI	Point of Interest
SRS	Spatial Reference System
SVG	Scalable Vector Graphics
SMS	Simple Message Service
SWE	Sensor Web Enablement
WAP	Wireless Application Protocol
WMS	Web Map Service
WPS	Web Processing Service
WFS	Web Feature Service
WWW	World Wide Web
W3C	The World Wide Web Consortium
XLS	XML for Location Services

Abbreviations specific to this study

ADB	Application Database
CMS	Cascading Map Service
AD	Application Developer

LIST OF APPENDICES