METHODS FOR BUILDING GEO-SOCIAL SYSTEMS IN THE INTERNET. MOBILE APPLICATIONS TECHNOLOGIES

Виконано аналіз соціальних мереж в Інтернет. Наведена класифікація соціальних мереж. Зроблено огляд сучасних мобільних платформ, складена їхня порівняльна характеристика. Розглянуто технології визначення місцезнаходження за допомогою мобільного пристрою

Ключові слова: мобільні платформи, соціальні мережі

Выполнен анализ социальных сетей в Интернет. Приведена классификация социальных сетей. Сделан обзор современных мобильных платформ, составлена их сравнительная характеристика. Рассмотрены технологии определения местоположения с помощью мобильного устройства

Ключевые слова: мобильные платформы, социальные сети

This article represents social network services analysis. General classification of social network services was described. Overview of modern mobile platforms was presented. Technologies for detection of geographical coordinates using mobile devices were discussed

Key words: mobile platforms, social networks

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1. Introduction

Humans are social beings by nature and express a need to connect with others no matter how big or small the connection is. It's common knowledge in medicine (specifically the area of Psychology) that humans deprived of social interaction will have problems developing normally. They may never learn to speak in full sentences, won't learn how to express their emotions, or even learn small things like how to comb their hair. Someone else has to teach them how to do it first. Despite of great amount of people around us there's a problem to find someone who has the same concerns. A social network service focuses on building and reflecting of social networks or social relations among people, e.g., who share interests and/or activities. A social network service essentially consists of a representation of each user (often a profile), his/her social links, and a variety of additional services. Most social network services are web based and provide means for users to interact over the internet, such as e-mail and instant messaging. Although online community services are sometimes considered as a social network service in a broader sense, social network service usually means an individual-centered service whereas online community services are group-centered. Social networking sites allow users to share ideas, activities, events, and interests within their individual networks.

In this particular article the analysis of modern social networks and technologies of geo-orientation for mobile applications will be discussed.

2. Social network services analysis

Social network — social structure which is created by individuals or companies. It shows a lot of connections between people by different relations from random acquaintances to close family relationships. We can consider that social networks in the Internet are reliable way for the users to get in touch with people and great way for the analysts to get statistic data.

Social network services are divided into two groups:
— general;
— topical.

General social network services — Internet-based platforms and web sites providing good possibilities to find people by different criteria from wider audience. They have everyt-

hing for ordinary presentation of different kinds of data. The top general social network services are:

— Facebook (more than 350 mil. active users) — the largest social network service in the world which is available on different languages. It is more useful in United States, Europe, Africa and Japan. Its big advantage is in access to all functions of the platform through API that definitely helps to build different additional applications for users;

— QQ (340 mil. users) — second by user amount in the world and first in China;

— MySpace (more than 185 mil. active users) — third largest in the world. It has a lot of settings for users to customize their pages. It is more popular in the world of music artist because it gives great abilities to promote their music. MySpace is one of oldest social network services on the web;

— VK (vkontakte) (more than 50 mil. users) — first by user amount in the CIS countries. It has the same abilities like Facebook but lack of powerful API is there.

Topical social network services — web systems that have useful tools to find people connected by different interests, hobbies or certain types of connection between them. There are a lot of popular services by each topic:

— LinkedIn — social network service based on business and professional connections. It has a lot of functions to get recent data about connections of each user and of course to have great opportunities for future work. Each profile can be quickly converted to actual CV and can be sent to recruitment company or individual company for one of open positions;

— Last.fm — the social music revolutionary service. Each user has the ability to scrobble music that he's currently listening to (send it to his profile on the server). Based on this data the service can give recommendations to user with the future music that might be listened by this user. It also contains good online radio, a huge catalog of artists, albums and publishers. The main social feature of this service is based on connections between people that may have the same music tastes and service automatically sets up itself in order to provide good possibilities in music communication;

— Flickr — social network service which is integrated in photo sharing system. Each user has an ability to share photos in his profile and then communicate and comment any photo. Account can be free or paid — it depends on photo amount in the profile or size of the photo after upload;

— Habrahabr — web portal as a news line and blog platform. The main topic of common blog system is information technologies, science and things the like. Each user has a list of blogs that he reads, the list of friends and companies which he prefer. Common stream of posts is very useful and gives the great advantage to fully dive into this community. Comment system is evolving and becomes so useful last time — after some posts there is a huge conversation between users that helps understand the topic described in the post as well. Popularity and activity of the users is controlled by "karma" system — conditional voting unit.

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3. Mobile platforms overview

A mobile device (also known as cellphone device, handheld device, handheld computer, "Palmtop" or simply handheld) is a pocket-sized computing device, typically having a display screen with touch input or a miniature keyboard.

In the case of the personal digital assistant (PDA) the input and output are combined into a touch-screen interface. Smartphones and PDAs are popular amongst those who require the assistance and convenience of a conventional computer, in environments where carrying one would not be practical. Enterprise digital assistants can further extend the available functionality for the business user by offering integrated data capture devices like barcode, RFID and smart card readers.

Each mobile device is controlled by mobile operating system or mobile platform. There are a lot of mobile platforms:
— Symbian;
— RIM BlackBerry;
— Apple iPhone;
— Windows Mobile;
— Google Android;
— Palm Pre.
Each of them has the following market share:

Global Smartphone Sales, Q2 2009

- Symbian 50.3%
- RIM Blackberry 20.9%
- Apple iPhone 13.7%
- Windows Mobile 9%
- Google Android 2.8%
- Other (Palm/Linux) 3.3%
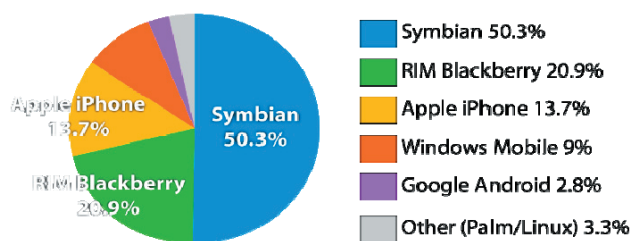
In each platform different methods and development technologies of applications are used:
— Symbian — C++ and Symbian SDK (Symbian Foundation);
— BlackBerry — Java and Sun Java ME (Research in Motion);
— Apple iPhone — ObjectiveC and Apple iPhone SDK (Apple);
— Windows Mobile — C#/VB and .NET Compact Framework (Microsoft);
— Google Android — Java and Google Android SDK (Google);
— Palm OS — C/C++.

For this moment we figured out that Google Android platform is more attractive for future development and has the biggest market share growing in the last couple of years. This is not a random fact — such achievements were made because of openness of platform implementation for the third party developers and of course by using the more popular programming language and platform Java.

Android is a software stack for mobile devices that includes an operating system, middleware and key applications, that uses a modified version of the Linux kernel. It was initially developed by Android Inc., a firm later purchased by Google, and lately by the Open Handset Alliance. It allows developers to write managed code in the Java language, controlling the device via Google-developed Java libraries.

The unveiling of the Android distribution on November 5, 2007 was announced with the founding of the Open Handset Alliance, a consortium of 65 hardware, software, and telecom companies devoted to advancing open standards for mobile devices. Google released most of the Android code under the Apache License, a free software and open source license.

Developers have considered that there are two ways to develop applications for Android:

— the code, which will be running in the virtual machine (Dalvik VM) — this is the more popular way to develop great applications for this platform — it is useful for ordinary tasks. It is safer by the meaning of memory leaks in the state of running. The code is written in Java;

— the code, which will be running directly in the system (Linux kernel) — invocation of each function by calling kernel — it is used by more complex system tasks or when more elegant memory or data management is needed. This includes internal work with devices. This code is obviously unsafe and it's written in C++.

4. Technologies for positioning

The Global Positioning System (GPS) is a U.S. space-based global navigation satellite system. It provides reliable positioning, navigation, and timing services to worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth which has an unobstructed view of four or more GPS satellites.

GPS is made up of three segments: Space, Control and User. The Space Segment is composed of 24 to 32 satellites in Medium Earth Orbit and also includes the boosters required to launch them into orbit. The Control Segment is composed of a Master Control Station, an Alternate Master Control Station, and a host of dedicated and shared Ground Antennas and Monitor Stations. The User Segment is composed of hundreds of thousands of U.S. and allied military users of the secure GPS Precise Positioning Service, and tens of millions of civil, commercial and scientific users of the Standard Positioning Service. GPS satellites broadcast signals from space that GPS receivers use to provide three-dimensional location (latitude, longitude, and altitude) plus precise time.

GPS has become a widely used aid to navigation worldwide, and a useful tool for map-making, land surveying, commerce, scientific uses, tracking and surveillance, and hobbies such as geocaching and waymarking. Also, the precise time reference is used in many applications including the scientific study of earthquakes and as a time synchronization source for cellular network protocols.

Nowadays there are a lot of GPS-navigators and GPS-modules for PDAs and laptops on the market. GPS-navigator is a GPS receiver with display which shows the information about location and GPS-module is a GPS receiver which is connected to computer or mobile device and transmits all the location data to the application that processes this data. They all differ only by form factor and don't have sufficient distinctions in the operations.

Android provides to applications the great abilities of location features which are supported by the device using the package named android.location. The main component is LocationManager which provides API for location services if the device itself supports this feature. As for other different system services there's no need to create new object of LocationManager class. Of course the actual object of LocationManager should be retrieved from the system by invocation of getSystemService(Context.LOCATION_SERVICE). This method should return the reference of LocationManager object in the memory in case if device has GPS-module.

When application has a reference to LocationManager object it could do three things:

— Request for a list of all known LocationProviders for this LocationManager by the last known location;

— Attaching / detaching for periodical updates of current location with LocationProvider (criteria or name should be mentioned);

— Attaching / detaching for current activity (display or form) if device is located in the area of proximity (mentioned in the range of one meter) of current latitude and longitude.

But in the time of first development in the emulator there's a problem for getting real location data by using system location provider (network or GPS). In this case dummy GPS data could be used — this data could be manually sent to emulator for application to process it as real.

5. Summary

The basic features of modern social network and mobile location services were discussed in this article. As for the current moment hardware and software stacks provide great possibilities to develop modern social network services based on user location. In general location makes a lot of additional functions and ideas for integrating them into ordinary social network service features. There are several successful mobile platforms nowadays and one of the most growing is Android. The basic ways to handle location data on the Android-based device are revealed.

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