

A Study on Social Network Service System for Location-based News

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Abstract

Analysis of Social Networking Service (SNS) usage indicates that users are using it to share professional knowledge and to share news, including information concerning incidents and/or accidents. While such information is shared on major SNS platforms, including Facebook and Twitter, effective management and searching is difficult. This paper proposes a SNS system for location-based news that can be posted based on the location of the subscriber and can be searched using the searcher's location information. The main purpose of the system is to bring hot location-related topic to the top of the user's list of events according to the user's moving location. SNS applications for location-based news are expected to be positioned as an effective platform for local news due to their ability to swiftly deliver local incidents/accidents information to their users.

Keywords: Social Networking Service, Location-based Information, Local News

1 Introduction

SNS is a service that supports the formation of social networks through establishing relationships between people and content by applying the concept of social relationships in the Internet space. Such SNSs include Facebook and Twitter, which are used for diverse purposes, including the exchange of information

between individuals concerning interests and hobbies [1]. They are also used to advertise organizations and products, as well as sales and marketing between corporations and users [2]. Various SNS open platforms, including BuddyPress, Pligg, Elgg, and Yammer, are being developed in accordance with the popularity and usefulness of the services used for the exchange of such information.

The news-based SNSs proposed in this study can be summarized as follows: There are two main purposes. The first purpose is to capture the characteristics of location-based news, and the second is to develop the functionality whereas hot issues can be extracted from the vast amount of information available [3]. Location-based news can be linked to the local news, and using SNS with such functionality as described above can have several benefits. First, there is the benefit in terms of time. By enabling swift and continuous response, the platform can deliver breaking news quickly. Second, the large number of users who post news can increase objective credibility. Since there are users who post diverse news, the platform can strategically provide fair, objective and distinguished news compared to other platforms. Third, rather than one-way news delivery, a two-way or multi-way news perspective can create a more friendly and credible relationship [4].

Also, moving beyond online communication among people who are closely located, the platform can enable offline communication, which can then lead to continuous SNS activities. This study aims to combine the mutual information analysis with the functionality of selecting hot events from the news. Since it is highly likely that Twitter and instant messages will deal with the issues that are hot topics at the time, this can enable the extracting of highlights from the events. Since the platform enables anyone to post information freely, social media content can be created. Therefore, a comparative analysis of the posts by different users within the same time period can help extract words used most often to suggest hot topics.

The organization of this paper is as follows: Chapter two describes the research trends of location-based SNSs, Chapter three explains how the location-based SNS system proposed in this paper functions, and Chapter four concluded the paper.

2 Related Work

Location-based services are a type of service that provides various information within the interested region of the user, centered on the user's location. The user's location is determined using the mobile devices that the user carries, via the distances between the base stations, or through any electronic equipment that includes GPS (Global Positioning System). Methods for detecting the location wirelessly can be divided into network-based and handset-based. With regards to the network-based method, using the network Cell-ID it determines the service Cell-ID of the base station where the user is included without additional devices. However, the accuracy of the location varies greatly depending on the size of the cell radius. The measuring error is greater using this

method than with other methods [5]. The AOA (Angle of Arrival) method uses the angle of two base stations, whereas the TOA (Time of Arrival) method uses the difference in the arrival time of the signal to at least three base stations. The TDOA (Time Difference of Arrival) method uses the difference in signal arrival time of one cell base station and two base stations. While the TOA and TDOA methods use a more complex algorithm than the AOA method, they enable a more accurate determination of the location. A hybrid method of combining TDOA and AOA can enable a more accurate determination of the location than the aforementioned methods [6]. A-GPS (Assisted Global Positioning System), which is a handset-based technology, is a method where the internal chip of the mobile device reads the location information sent by a GPS satellite. It is used widely by CDMA mobile communication businesses. A-GPS shows 67% accuracy within 50m, and 95% accuracy within 150m. The drawback of this method is that it cannot be used indoors. WPS (Wi-Fi Positioning System) shows accuracy at 20m, and has the benefit of being able to be used both indoors and outdoors [7]. Outdoors, it uses the GPS-based location determination factor of smart phones, and indoors uses the WLAN-based determination factor.

LBS (Location-based services) technology refers to the providing of services by identifying the user's location and using that location-based information. With the development of wireless communication infrastructure and Internet-related technology and its combination with mobile technologies, it is being applied to various applications [8]. Location-based services targeting individual users can be categorized as; communication: fleet management: routing: safety and security: and entertainment [9]. The purpose of the communication service is to provide diverse information that is based on location. Google Maps is a representative example that provides maps and regional vacation information, centering on the user's location. By focusing on the user's location to provide weather and climate information, it enables users to use the search function. Fleet management services enable the tracking of vehicles and products. This service helps corporations track rental cars or freight cars, and helps users to track the delivery status of goods that they have ordered. When linked to the public transportation system, it can also provide users with information on bus and subway locations and estimated times, thereby providing enhanced convenience. Routing services provide routes according to the current traffic and surrounding conditions. These services enable corporations to enhance efficiency by providing real-time routes for delivery, and enable users to enhance their convenience by providing optimized driving routes that take traffic conditions into account. Safety and Security services enhance safety by identifying the location of the user as well as family members of a specific user. Upon the user's emergency rescue services request, the service sends the user's information to an emergency center. In the case of traffic accidents, the services can be used efficiently to provide user location data to the insurance company so that they can allocate the closest agents. Entertainment services provide dating services, recreational and entertainment information, all centered on the user's location. It can also be used in linkage with location-based games. Likewise, with the development of smart phones, location-

based services are being used for public safety by preventing accidents. Such services have the potential of being further developed into various applications by being applied to social network services, augmented reality, and games.

Location-based services are being developed in combination with social networking services, which are applications developed to allow user communication. While the fundamental basis of social networking services is the limitless expansion through common topics, moving beyond regional restrictions, there are also networks, like traveling networks, that are based on location. Facebook provides a user's location in a simple manner. However, the location-based social networking services must be developed appropriately due to the fact that location-based services face limitations, including difficulties linking with maps. Location-based social networks have further potential for development by being linked to commercial services, moving beyond simply providing information.

3 Location-based News SNS Application

3.1 Application Overview

People today use SNS to share their daily lives and to promote friendship, and selectively use SNS for other purposes. Facebook, one of the most widely used SNS, has become popular not only by allowing users to share their daily lives and promote friendship, but also by allowing users to post texts and images about accidents and incidents. Moving beyond the sharing of simple information, it is also used more actively when reported images and messages are being shared. Likewise, the sharing of 'incidents/accidents' has become one of the major reasons for using SNS [10]. A lot of information related to news is shared via SNSs. In that news, there is content that includes regional characteristics. In the case of accidents, it is effective for people within the same region of the place of origin to share information real-time. Linkage with map services can also enable effective sharing of regional information. On popular SNS platforms, including Facebook, Twitter and Instagram, the post is delivered only to the users who are followers; therefore there are restrictions for these platforms to be used for the purpose of location-based information sharing. For this reason, we developed a location-based SNS application that not only shows the real-time incident/accident issue but also enables automatic input of the user's location with each post, and allows users to find the uploaded posts on the map at a glance.

This location-based news SNS application was developed for the Android platform. As shown in Figure 1, a post written by a user and uploaded onto the server is then saved in a database. On the other hand, when the data is shown to the users, it is received from the server via Json.

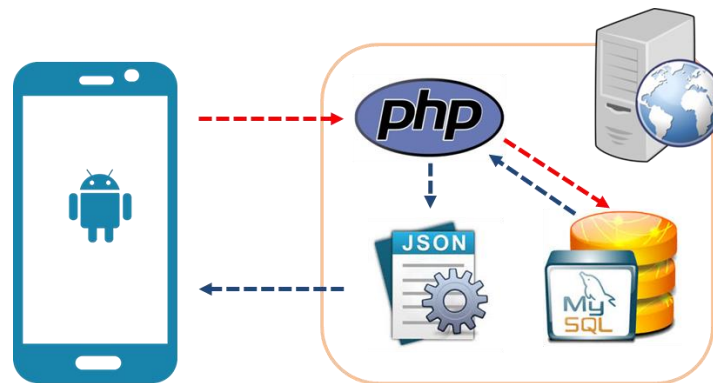


Figure 1. The Architecture of the system

3.2 Main Functions

The main functionality of the application can be categorized as; membership sign up/log-in: a real-time news page: a post writing page: and a post uploading page where users can upload their posts. The membership sign up/log-in page is shown in Figure 2. It is a page where users can sign up as a new member and use their ID to log into the system. As the very first page of the application, the user can only upload posts after they have logged in. In the login page, users can log in once they type in their ID and password.



Figure 2. Membership sign up/Log-in Page

When the user clicks on the 'sign up' button after filling in his or her information, the user information will be saved in the 'user' table on a MySQL database. If the typed ID already exists, a notification message will pop up. In the login procedure, if the user types in the ID and password, the system searches the 'user' table to ensure that the information is valid. The user can only upload posts when the ID and password are correct, and if not, an error message will be shown.

user_num	user_id	user_password	user_salt	user_email	user_likearea	user_home
1	koi	ZzJWML7qXX9qsAK6k0hRXb7YEUwYzk5NmMONTJk	0c996c452d	koi@naver.com	NULL	NULL
2	uiui	ysOjX750wDtoixFx3xclGiQzgszYTRINjk4NjZj	3a4e69866c	uiui@naver.com	NULL	NULL
3	uiui8	1QozqJELTgcFQ7ytNgDi/NRWw40zYzI3ZDdIYTE5	3c27d7ea19	uiui8@naver.com	NULL	NULL
4	7878	jMp3AE2Etcem1yqaKSHY6SeTQGE5Nzg3YjY1Y2Zm	9787b65cff	7878@naver.com	NULL	NULL
5	55	CqBbhkRgzUx4ciqv63d9tUc0F1ZWE5NmQ2MmRj	5ea96d62dc	55@naver.com	NULL	NULL
6	oo	sLuTg3pwlMQWrP6k7NCHZ3QguzBjY2FmZjBmZTNI	ccaff0fe3e	oo@naver.com	NULL	NULL
7	89	T3ErqKOyvtg45kOKIFKYzVNWw1NjAzYzZINTE3	5603c6b517	89@naver.com	NULL	NULL
8	ji	jV/w31RMP+bnwE5SWkbJ6SXw/ppjMjRIZjVjNjM2	c24ef5c636	ji	NULL	NULL
9	lk	bmYpFVX8Pj+JVBM+bxvJua8c0YjY3ODA2NWEz	4b678065a3	lk@naver.com	NULL	NULL

Figure 3. ‘User’ DB table

The ‘real-time news’ page is a page where users can check incidents/accidents that have become hot issues. It is linked to the news delivered by the portal websites through the function of searching real-time hot topic search words related to the recent incident/accident. Open API from Naver was used for recent news, and Open API from Daum was used for real-time hot topic search words. The real-time hot topic search word function looks for the search words, including previously designated key words related to the incidents (fire, murder, accident, etc.), designates them as 'rapidly rising incident search words,' and shows them on the application page. Clicking on the 'view related article' button next to the rapidly rising incident search word shows all the related articles in a list. Users can also search for news by using the input words.

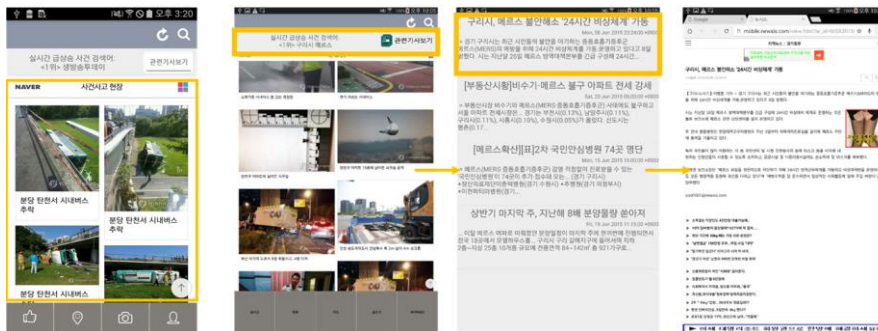


Figure 4. News search pages

The ‘post writing’ page is similar to the function of the SNS, where users can post pictures and texts about incidents/accidents that have occurred within their vicinity. While conventional SNS enables search through the tag function, the proposed application has the benefit of enabling users to view the location of incidents or accidents on the map. By managing the posts based on the map, users can search posts based on their interested location, and can move to other locations on the map using the spinner.

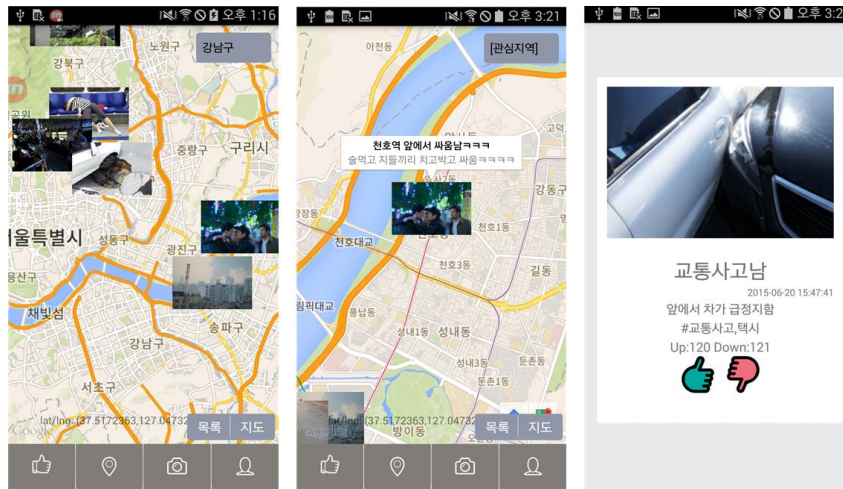


Figure 5. Map-based news page

The ‘post uploading’ function enables users to upload images and texts. As shown in Figure 6, the user can either select the image from their own gallery or take a picture, and add a title, content and tags. The user can also input the location of the occurrence. If GPS is turned on, the current location of the user will be automatically uploaded.



Figure 6. Upload accident news

In ‘my page’, the user can find his or her own ID, and a spinner where the user can set the interested region. Selecting the interested region will automatically show the selected region on the ‘post writing’ page. This enables users to instantly view posts related to the region of interest.

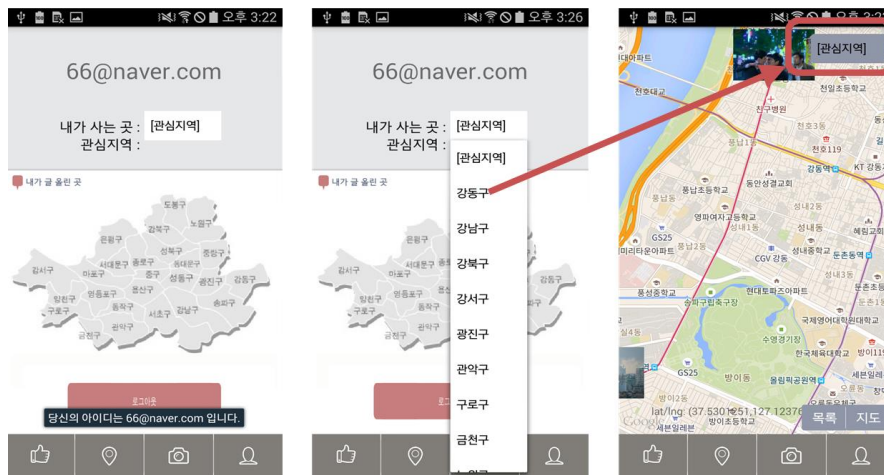


Figure 7. Registration of interest region

4 Conclusion

This paper proposes an SNS system for location-based news that can be searched easily by applying multi-dimensional location data to the user's location-based information, images and posts. The server system using 'R-Tree', which is a method of utilizing multi-dimensional location data for location-based news SNS, was developed. The proposed system was developed as an Android application. The main function of this system is that the news information and hot issues are viewed on top of the news event list at the time the user's post is uploaded via mobile devices. When the user uploads a post via the mobile device, the GPS module in the device receives the location and transmits that information to enable the saving of location-based news, and all the information transmitted via the server is shown on a map. This SNS application developed for location-based news can be positioned as an effective location-based news SNS suitable for local news by swiftly delivering regional incidents/accidents information.

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