

Real-Time Event Detection and Earthquake Reporting System for the Twitter Users

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Abstract

Twitter is a popular micro blogging service and its important characteristic is its being real-time in nature. The earthquakes event in twitter is a real-time interaction and it's developed by particle filter algorithm to monitor msg and to detect a target event. Particle filter algorithm is used to find out location of an event. JMA broadcast technique has been used to distributes the warning information to stations and mobile phone companies, before the occurrence of earthquakes. JMA broadcast announcements consume more time to broadcast earthquake early warning informations among the advanced users world.

Twitter is a popular micro blogging service and its important characteristic is its real-time nature. In the proposed system, the real-time interaction of events are investigated such as earthquakes in twitter, system detects earthquakes promptly and notification is delivered much faster than JMA broadcast announcement. In this paper considering each twitter user as a sensor, particle filtering algorithm is applied which is widely used for location estimation in ubiquitous computing.

Keywords: Twitter, Micro Blogging Service, Event Detection, Earthquake, Location Estimation and Social Sensor, Particle Filter, Semantic Analysis

several times in a single day. Users can know how other users are doing and often what they are thinking. Users repeatedly return to the site and check to see what other people are doing. All these things are based on real-time nature. Twitter is used for various real-time notifications such as those necessary for help during a large-scale fire emergency or live traffic updates.

In this paper we investigated the real-time nature of Twitter that is designed to ascertain whether we can extract valid information of the event. We propose an event notification system that monitors tweets and delivers notification promptly using knowledge from the investigation. In this paper, we take three steps: first, we crawl numerous tweets related to target events; second, we propose probabilistic models to extract events from those tweets and estimate locations of events; and finally, we developed an earthquake reporting system that extracts earthquakes from Twitter and sends a message to registered users.

This paper is organised as follows: the next section tells on related work, the third section focuses on the implementation of the system. The fourth section discusses the experimentation and results obtained. And the final section summarises main conclusions.

Introduction

Twitter is based on the real-time nature of one social networking service which is also applicable to other micro blogging services, Twitter has very high popularity and data volume. Micro blogging is a web service that allows the subscriber to broadcast short messages to other subscribers of the service. Twitter users write tweets

Related Work

Existing System

Micro blogging service is a web service that allows the subscriber to broadcast short messages to other subscriber. It is a real-time Q & A (Passant *et al.*, 2008).

Scholars, advertisers and political activists see massive online social networks as a representation of social interactions. A study of social interactions within Twitter

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reveals that the driver of usage is a sparse and hidden network of connections underlying the declared set of friends and followers (Bernardo, Daniel & Fang, 2008).

Twitter acts as a tool for active learning in the EFL classroom. Kerstin Borau *et al.* (2009) provide the first detailed analysis of how Twitter was used to learn specific aspects of language. It is suitable to train communicative and culture competence anytime anywhere without face-to-face interaction.

Twitter is a popular micro blogging service in which users post messages that are very short: less than 140 characters, averaging 11 words per message (O'Connor *et al.*). The paper by O'Connor *et al.* connects measures of public opinion derived from polls with sentiment measured from analysis of text from the popular micro blogging site, Twitter.

JMA broadcast technique has been used to distribute the warning information to stations and mobile phone companies, before the arrival of earthquakes, tsunamis etc. The timing of a warning depends on conditions when a warning can be issued and received (Sakaki, Okazaki, & Matsuo).

Disadvantages of the Existing System

1. Some issues involved in this paper are data privacy, private aggregation communities, and building personalised views and aggregation services for public updates (Passant *et al.*, 2008).
2. The linked structures of social networks do not reveal actual interactions among people (Bernardo, Daniel & Fang, 2008).
3. It is of very high complexity (Kerstin Borau *et al.*, 2009).
4. It takes more time to deliver the messages (O'Connor *et al.*).
5. JMA broadcast announcements consume more time to distribute earthquake early warning information's among the advanced users world (Sakaki, Okazaki, & Matsuo).

System Implementation Proposed System

In the proposed system, the real-time interactions of events are investigated such as earthquakes in twitter. System detects earthquakes promptly and notification is

delivered much faster than JMA broadcast announcement. An earthquake reporting system using event detection algorithm is developed, considering each twitter user as a sensor and applying particle filtering algorithm which is widely used for location estimation in ubiquitous computing.

Advantages of the Proposed System

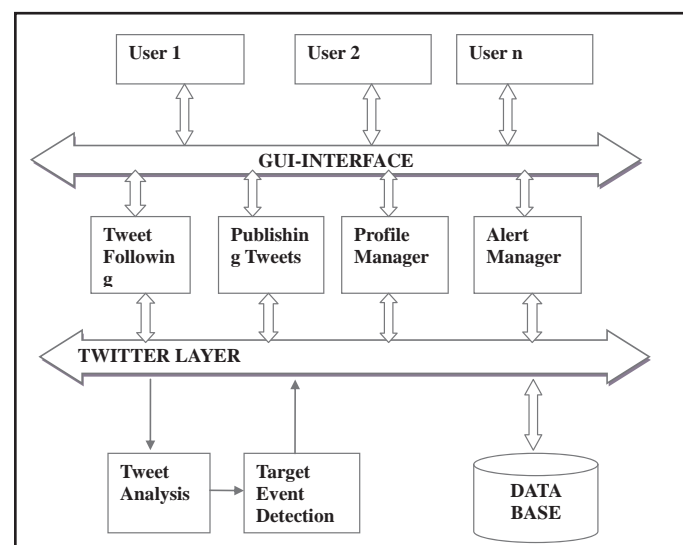
The proposed system has the following advantages

- Particle filtering algorithm is used to estimate the location of events. It develops an earthquake reporting system which is a novel approach to notify people promptly of an earthquake.
- Earthquake notification is delivered much faster than JMA broadcast announcements.

Architectural Design

The system architecture defines the structure of the developed system, which comprises different components or modules, their externally visible properties and the relationships among them. Figure 1 explains the overall architecture diagram for this project.

Figure 1: Architectural Diagram



Detailed Design

Detailed design will explain the software components in detail. This will help in the implementation of the system.

Moreover, this will guide the further chances in the system to satisfy the future requirements

The detailed design explains every module in detail.

- Authentication
- Profile Manager
- Tweet Subscription
- Tweet Analysis
- Alert Sender

Authentication

In **Authentication** module, if new user is going to login to consume the service then the user has to register first by providing necessary details. After successful completion of sign up process, the user has to login to the application by providing username and password. The user has to provide same username and password which was provided at the time of registration. If login is successful, it will take to main page else it will remain at the login page itself.

Profile Manager

In this module, user can create a profile to maintain their personal information and also can customize the tweet subscription process. The personal information involves address, contact number, profile picture, occupation etc.

Tweet Subscription

In this module, registered user can subscribe to the tweets from different sources by following the genuine tweet maker. Once subscribed, all future updates are sent to the subscriber through electronic communication. There are four types of response actions performed in tweet subscription which are compose tweet, read tweet, following and profile setting. The compose tweet action allows the user to send messages either in private or public. The read tweet action allows the user to read the message from different sources. The following action allows to follow numbers of users. The profile setting action allows the user to edit the user's details.

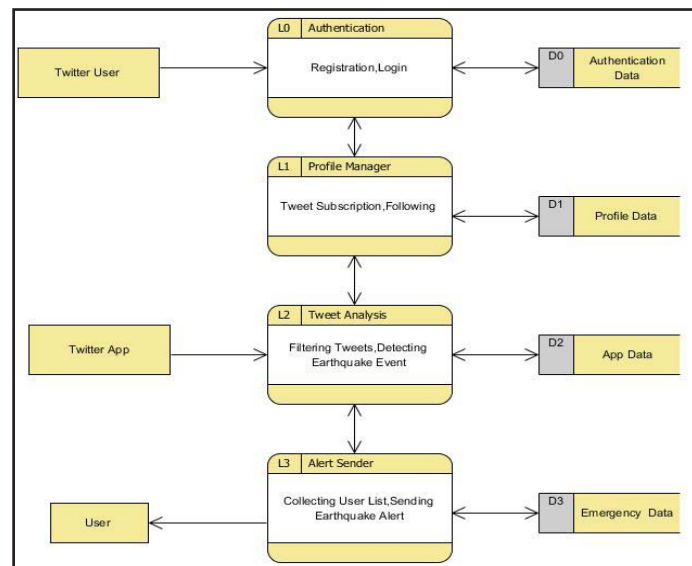
Tweet Analysis

This module helps to identify the tweet having information about earthquake and will detect the target event.

Alert Sender

This module helps to distribute the alert message to twitter recipients through electronic communication.

Figure 2: Detailed Design



Implementation

Implementation is the stage of the project (Phase- I) when the theoretical design is turned out into a working system. Thus it can be considered to be the most critical stage in achieving a successful new system and in giving the user, confidence that the new system will work and be effective.

The implementation stage involves careful planning, investigation of the existing system and its constraints on implementation, designing of methods to achieve changeover and evaluation of changeover methods. The application is developed using Net Beans as front end and SQL server is used as backend.

In this module we create a user page using GUI, where in user can send message from one source to another. User can read the messages from many different sources and also user can maintain their personal information. He/she can identify the tweet having information about earthquake and will detect the target event.

Figure 3 shows the main page where user can access their login and also can create a new account.

Figure 3: Screenshot for Main Page

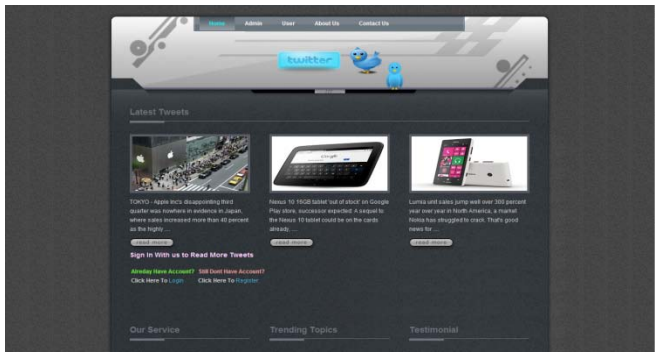


Figure 4 depicts registration details about the following fields required to open an account on twitter.

Figure 4: Screenshot for Registration Page

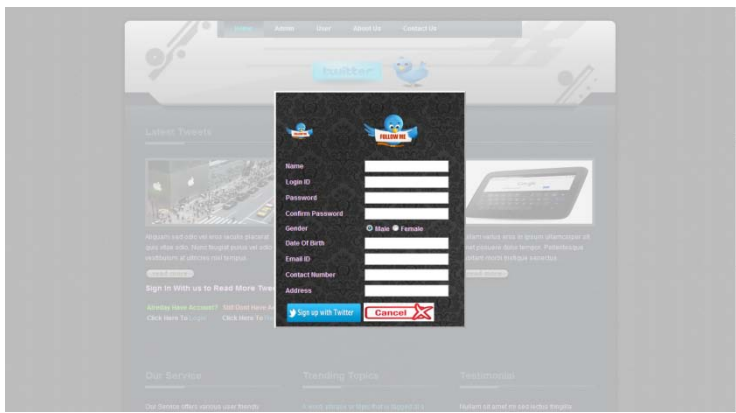


Figure 5 depicts login page used to access the user account.

Figure 6 shows the user's homepage where user can access and compose tweets, read tweets, and change profile settings.

Figure 5: Screenshot for Login Page

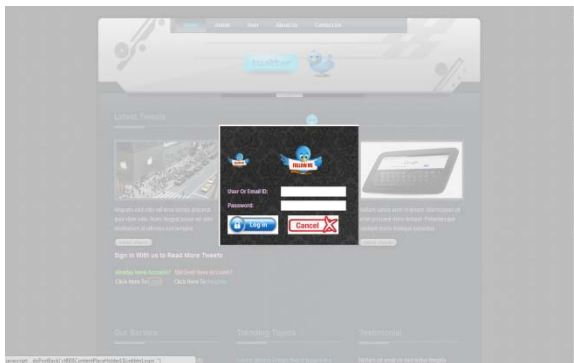


Figure 6: Screenshot for User Home

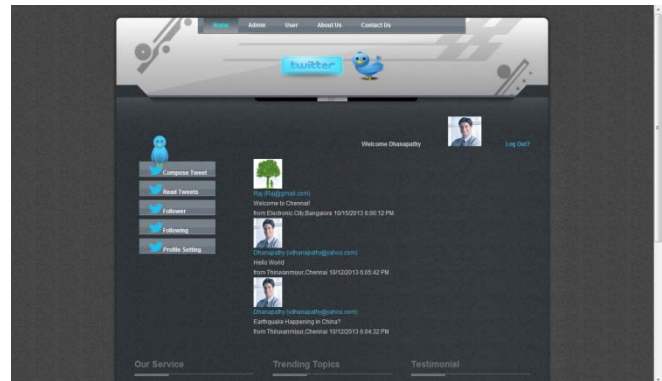


Figure 7: Screenshot for Showing Users Following Tweets

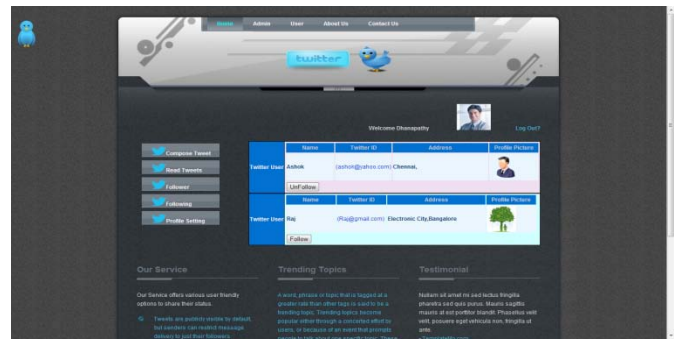


Figure 7 depicts the numbers of other users who follow the user.

Figure 8 depicts the profile of an user which holds the forms containing details like profile picture, occupation, city, country, pin, mail alert type etc.

Figure 8: Screenshot for Profile Page

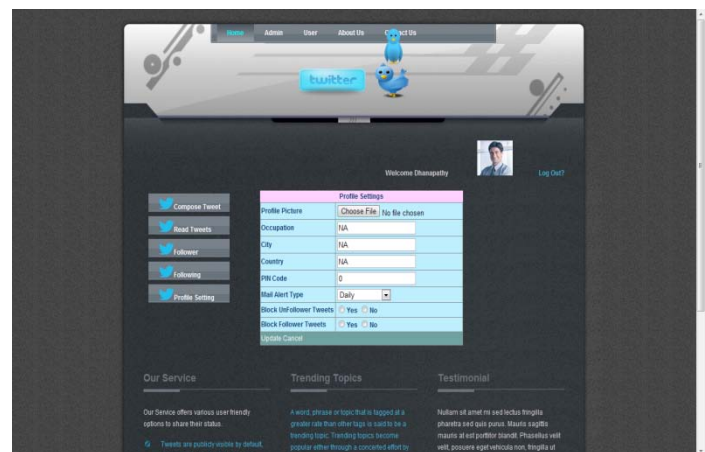
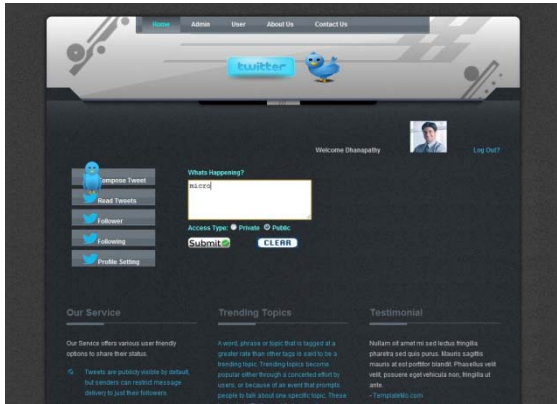


Figure 9 depicts the compose tweet used by user to send messages

Figure 9: Screenshot for Compose Tweet



Results and Conclusion

In the previous sections, the requirement analysis, design, implementation and testing were discussed. This section discusses the result, conclusion and future enhancement.

Results

The result of the project (Phase- I) “Real-time event detection and earthquake reporting system for the twitter users” is used to send alert messages to the twitter users for the upcoming event by using particle filtering algorithm. The particle filtering algorithm is used to estimate the location.

Conclusion

The real-time nature is investigated in twitter, devoting particular attention to event detection. Semantic analyses

were applied to tweets to classify them into positive and negative classes. Each Twitter user is considered as a sensor, and the problem is set as detection of an event based on sensory observations. Location estimation methods such as particle filtering are used to estimate the locations of events. In this paper, an earthquake reporting system is developed, which is a novel approach to notify people promptly of an earthquake event.

Future Enhancements

As a future enhancement, we plan to identify the spam tweets that are posted by spammer and suspend any user reported to be a spammer from twitter network.

References

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