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Natural Disaster Recommendation Speedy Emergency Alert system using Twitter for social networks

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***Abstract*—**Exponential growth of information generated by online social networks demand effective recommender systems to give useful results. Traditional and Existing system approaches become unqualified because they consider only social relation and network structure but social contextual information has not been fully considered .In this paper we investigate the problem based on social contextual factors. we conduct experiments on Twitter style unidirectional social network datasets. We investigate the real-time interaction of events such as tsunami, earthquakes, cyclone in Online Chat Application and propose an algorithm to monitor chats and to detect a target event. To probe such interactions, device a classifier using Support Vector Machine (SVM) of tweets based on keywords in a tweet, the number of words, and their context. It regards each user as a sensor, and analyzes a spatial and temporal pattern of an event and applies particle filtering which used for location estimation. Also developing an earthquake reporting system detects earthquakes and notification is delivered to nearest users and rescue team. This system detects earthquakes and notification is delivered faster than JMA broadcast announcements.

Keywords— *chat, event detection, social sensor, location estimation, natural disaster: earthquake*

I. INTRODUCTION

Social network users generate large volume of information which makes it necessary to exploit highly accurate recommender systems to assist them in finding useful results. To address this problem, we propose a Twitter like application to investigate event in Natural Disaster. Here, in this paper we focus on Earthquake. In order to obtain chats on the target event precisely, we apply semantic analysis of a chat. For example, users might make chats such as “Earthquake!” or “Now it is shaking,” for which earthquake or shaking is a keywords, but users might also" attending Earthquake Conference,” or “Someone is shaking hands with my boss.” We prepare the training data and devise a classifier Support Vector Machine (SVM) based on features such as keywords in a chat, the number of words, and the context of target-event words. After doing so, we obtain a probabilistic spatio temporal model of an event. We then make a crucial assumption: each Online Chatting Application user is regarded as a sensor and each chat as sensory information. These virtual sensors, which we designate as social sensors, are of a huge variety and have various characteristics: some sensors are very active; others are not. A sensor might be inoperable or malfunctioning . sometimes, as when a user is sleeping, or busy doing something else. Consequently, social sensors are very noisy compared to ordinary physical sensors. The rest of paper is organized as follows: Section 2 describes the Related works Section 3 proposed scheme section 4 system model Section 5 proposed scheme evaluation section 6 proposed scheme of work And finally, the conclusion and future work are summarized in section 7.

II. RELATED WORK

The related works in existing system mainly considering [1]Traditional collaborative filtering techniques do not consider social relations, making them difficult to provide accurate Recommendation. Recently [2][3] Ma etal proposed a framework in which it consider social relation but social contextual information was not fully considered. It is challenging and significant to discover contextual factors(i.e. individual preference and interpersonal influence) from the contextual information and integrate them into a unified framework. Therefore, only when individual preference and interpersonal influence are properly incorporated into recommendation, can the uncertainty be reduced and quality improved. Users typically examine items’ content and information on senders.

For example, in Twitter, when a user receives a tweet that is posted by one of his friends (the sender), he usually reads its content to see whether the item is interesting. We can get this knowledge from item content and user-item interaction information. In this case, the user cares about who the sender is and whether the sender is a close friend or authoritative. If more than one friend sends him the same tweet, he may read it more attentively. This knowledge can be learnt from social relation and user-user interaction information Both of these aspects are important for the user to decide whether to adopt (e.g., share, retweet) the item or to refuse the content. But, there is a huge proliferation about the tweets recently. Online Chat Application has received much attention. An important characteristic of Online Chat Application is its real-time nature. Twitter channel for users to receive and to exchange information. It is an online social network used by millions of people around the world to stay connected to their friends. Every day, nearly 170 million tweets are created and redistributed by millions of active users. Twitter has several unique advantages that distinguish it from news web sites, blogs, or other information channels. First, tweets are created in real-time. The tweets are in 140-character-message limit and the popularity of Twitter’s mobile applications, users tweet and retweet instantly [4]. For example, we could detect a tweet related to a shooting crime 10 minutes after shots fired, while first news report appeared approximately 3 hours later. Regarding each Online Chatting Application user as a sensor, the event-detection problem can be reduced to one of object detection and location estimation in a ubiquitous pervasive computing environment in which we have numerous location sensors: a user has a mobile device or an active badge in an environment where sensors are placed. Through infrared communication or a Wi-Fi signal, the user location is estimated as providing location-based. We apply particle filters, which are widely used for location estimation in ubiquitous/pervasive computing .This work presents an investigation of the real-time nature of Twitter that is designed to ascertain whether we can extract valid information from it. 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 developed an earthquake reporting system that extracts earthquakes from Twitter and sends an alert message to registered users as well as to the rescue team. Here, we explain our methods using an earthquake as a target event.

III .THE PROPOSED SCHEME

This paper proposes an algorithm to monitor tweets and to detect a target event and producing a probabilistic spatiotemporal model for target event that can find the center of event location. The proposed scheme uses a particle filter for location estimation. It can be achieved by regarding each user as a sensor, and analyzes a spatial and temporal pattern of an event and applies particle filtering which used for location estimation.

IV. SYSTEM MODEL

We manually give a set of queries for the target event. For example, we will search for " earthquakes” and “shaking” if our target event is earthquakes. By searching every second, we can obtain a subset of tweet that all contains the keyword in our searching queries. Then, for each tweet in our searching result, obtain semantic features as its feature vector, then apply our classifier to the tweet and get a value positive and negative.

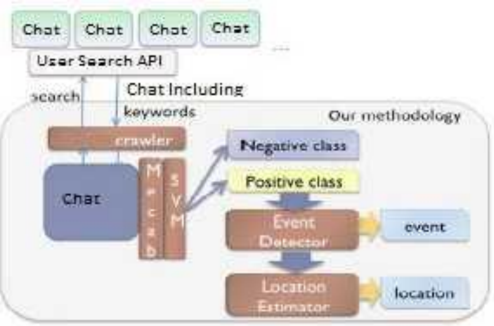


Fig :System model of Twitter API

4.1. Application Creation

Creating an Application, we will be using Advanced Java Concepts like JSP and Servlets. While creating the application, we will assign the design fields like username, password, phone and other information. The user will enter the tweets through this application.

4.2. Server

The Server will analyze the user's contents. So, the server will extract the keywords from the tweets. Also the server will be retrieving the user information like access time and location which is used to find the user's location.

4.3. Extracting The Keyword Using Particle Filter

After successful creation of an application, the server will analyze the tweets and extract the Keywords using Particle Filter. The Particle filter will extract the Keywords and filter the unwanted words using the stemmingalgorithm.

4.4.Automatic Alert To Registered User

After the event is identified and confirmed ,we send SMS alert and Email the registered user in Twitter once we attains the Maximum Peak of the extracted Keyword.To generate an SMS alert will include the Java Archive file called "JSMS " and will get the Rescue team's information in via Coding. So that we'll generate the SMS. For Email Alert we will generate the email using Email Coding and it will be send to the Rescue Team via Internet. For sending an SMS will connect the Nokia PC suite configured mobile via Data cable with Server. This Nokia PC suite configured mobile will transmit the SMS to the rescue team.

V. PROPOSED MODEL EVALUATION

The Performance report of the proposed model the existing model is described in Table 1.

Features	Recall	Precision	F-value
A	*87.50%*	*63.64%*	*73.79%*
B C	*87.50%*	*38.89%*	*53.55%*
AL	*50.00%*	*63.64%*	*55.53%*
L	*87.50%*	*66.34%*	*73.35%*

Table 1: Classification Performance

VI. PROPOSED WORK

6.1 EVENT DETECTION

An event is an arbitrary classification of a space/time region. An event might have actively participating agents, passive factors, products, and a location in space/time .we target events such as earthquakes ,tsunami and traffic jams ,which are visible through tweets.

6.1.1. Semantic Analysis

To detect a target event from twitter, we search from Twitter and find useful tweets. To obtain tweets on the target event precisely, we apply semantic analysis of a tweet: for example, users might make Tweets such as "Earthquake!" thus earthquake could be Keywords, but user might also make tweets such as " I am attending an earthquake conference". Moreover ,even though a tweet refers to the target event, it might not be appropriate as an event report; for example a user makes tweets such as "The earthquake yesterday was scaring", or "three earthquakes in four days, Japan scares me". these tweets are truly the mentions of the target event, but they are not real-time reports of the events. Therefore, it is necessary to clarify that a tweet is actually referring to an actual earthquake occurrence, which is denoted as a positive class, by preparing positive and negative examples as a training set, we use a SVM to classify tweets automatically into positive and negative categories. We prepare Three groups of features for tweet as follows Features (Examples: I am in Japan, earthquake right now!)

1) Statistical features(7 words ,the 5th word).

The number of words in a tweet message and the position of the query within a tweet.

2) Keyword features (I, am ,in, Japan, earthquake, right ,now):the words in a tweet.

3) Word context features(Japan, right): the words before and after the query word.

We search the tweet and found out one user posted a relevant tweet ,then we classify it into positive class, the users function like a sensor of the tweet, therefore it is considered as output of an event. In order to make our event detection feasible, we made the following assumptions:
1.Each Twitter user is a sensor, which detects a target event and makes a report following a certain probability.

6.1.2.Spatialmodel

Each tweet is associated with a location. If the probability given by the temporal model is larger than the threshold ,the next steps is to determine the event location. We obtained the Location information of each tweet using its associated GPS data or the registered location. we then apply particle filter to all set of tweet to obtained the event location. To calculate the location several methods of Bayesian filters are proposed such as Kalman Filters ,multihypothesis tracking, grid-based and topological approaches and particle filters. For this study we use particle filter to estimate location of an event.

6.1.3TemporalModel

Each tweet is associated with its post time, and we use this information as the estimated occurrence time of our target event. We use GPS data and the registered location of a users as the location information .We form a temporal model which gives the probability of event occurrence at time t, for a given tweet that is a positive example. If the probability is more than the predefined threshold, then it determines the actual occurrence of an event. This includes choosing an appropriate threshold and the build of temporal model:
1. The false-positive ratio Pf of a sensor is approximately 0.35.
2. Sensors are assumed to be independent and identically distributed.

In the Online Chat Application case, we can infer that if a user detects an event at time 0,then we can assume that the probability of his posting a chat from t to Δt is fixed as α. Then, the time to produce a chat can be regarded as havingan exponential distribution. user might make a post only after such problems are resolved.

6.1.4.Particlefilter

Particle filter is a probabilistic approximation algorithm implementing a Bayes filter, and a member of the family of sequential Monte Carlo methods. The particle filter works better than other comparable methods for estimating the locations of target events**.** The whole algorithm is given as follows:
1.Put a query Q using search API every s seconds and obtain tweets T.
2.For each tweet t belongs to T, obtain statistical, keyword, word context features, apply the classification to obtain value 0 and 1.
3.If the tweets reached Threshold Limit then proceed step 4.
4.For each tweet t € T, we obtain the latitude and the longitude using 1)GPS location 2)making a query to Google Map for the registered user .
5.Calculate the estimated location of the event using normal particle filtering.
6.Send alert E-mail and message to registered user as well as to nearest rescue team.

6.1.5.Stemmingalgorithm

Stemming is one technique to provide ways of finding morphological variants of search terms .Used to improve retrieval effectiveness and to reduce the size of indexing files. These algorithm is used to extract the unwanted words from tweet.

VII.RESULT AND DISCUSSION

we will create an application to tweet with our friends. For creating an Application, we will be using Advanced Java Concepts like JSP and Servlets. While creating the application, we'll assign the design fields like First Name, Last Name Phone E-mail id and Username, Password,. Once the application created the user is allowed to login.

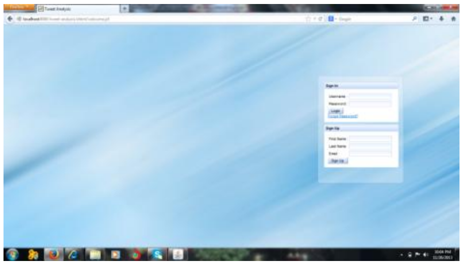


Fig: User Login Form

Server is used to verify the user information and allow the User to Tweet with their friends. Also the Server will analyze the contents user. So that the server will extract the Keywords. Also the Server will be retrieving the user information like Access time and location which is used to find the User's location and we can provide the any necessary help to them.

EYWORD EXTRACTOR

The Server will analyze the Tweets between the Users and the extract the Keywords using Particle Filter. The Particle Filter will the extracts the Keywords and filters the other words using the Stemming Algorithm. By using the Stemming algorithm we can filter the unwanted words in the chat so that we can calculate the extracted words counts. So that we will generate an automatic **SMS** alert to the Rescue Team.

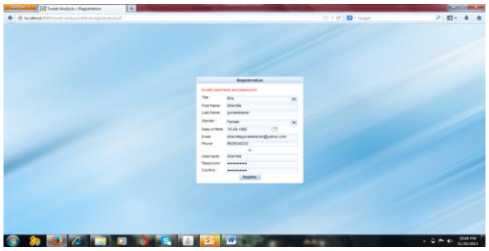
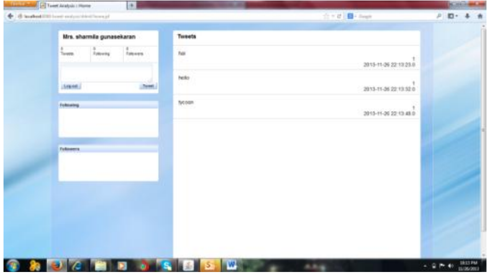


Fig: New User Registration Form



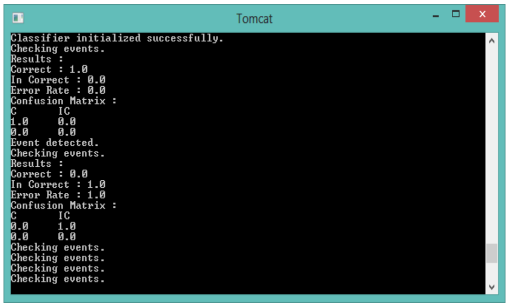
fall
2013-11-26 22:13:23.0

hello
2013-11-26 22:13:32.0

tycoon
2013-11-26 22:13:48.0

Fig: Tweet Page

We send the SMS alert and Email to the rescue team once we attain the Maximum Peak of the extracted Keyword. To generate an **SMS** alert will include the Java Archive file called **J**ava **S**hort **M**essage **S**ender(**JSMS)** and will get the Rescue team's information in via Coding. So that we will generate the **SMS.** For Email Alert we will generate the email using Email Coding and it will be send to the Rescue Team via Internet. For sending an SMS will connect the Nokia PC suite configured mobile via Data cable with Server. This Nokia PC suite configured mobile will transmit the SMS to the rescue team.



```
Classifier initialized successfully.
Checking events.
Results :
Correct : 1.0
In Correct : 0.0
Error Rate : 0.0
Confusion Matrix :
C       IC
1.0     0.0
0.0     0.0
Event detected.
Checking events.
Results :
Correct : 0.0
In Correct : 1.0
Error Rate : 1.0
Confusion Matrix :
C       IC
0.0     1.0
0.0     0.0
Checking events.
Checking events.
Checking events.
Checking events.
```

VIII.FUTURE ENHANCEMENT

It Can be enhanced in mobiles also using same technique.An alert message can be send to all the numbers which is registered in Twitter account Server is used to verify the user information and allow the User to Tweet with their friends. The server will store the data and allow the user to enter in to the chat application. The User will enter the tweets through this application. The tweet messages have been displayed to all the followers. The tweet messages as well as the user's login time are stored in Database.

IX.CONCLUSION

In this paper we proposed a Real Time Event Detection by Twitter, which utilizes the real-time nature of Twitter. We notification to all the registered users and as well as to the rescue team and it guarantees efficiency as well and save people. We investigate this paper for social networks, for analyzing non-social network implementation moves to future work.

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