Traffic Congestion Detection Using VANET

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***Abstract*-Nowadays traffic on the roads is becoming a major problem in developed cities. With the advancement in technology vehicles themselves could be used to compile and analyse traffic data and relay it to the drivers in a format that will allow them to make smart decisions to avoid congested areas, resulting in congestion control. CoTEC (COperative Traffic congestion detection), a novel cooperative technique based on Vehicular Ad-Hoc network (VANET) is one of the best solution which enables vehicle to vehicle communication. Vehicular ad-hoc networks (VANET) presents a strategy to control congestion with the help of vehicle-to-vehicle(V2V) and vehicle to infrastructure(V2I) communication. This can be achieved by transmission of messages which alerts the drivers about possible traffic breakdown. The message transmitted will guide the driver so as to take the decision needed to control the traffic congestion.**

Keywords: VANET, MANET, V2V, V2I, Traffic congestion.

I. INTRODUCTION

The main contribution we present in this work is a novel future location prediction algorithm for moving objects that relies only on standard information provided by Smartphone to localize the users, thus not requiring GPS sensor data.[3] In indoor environments the active users motion prediction system and wireless localization technology play an important role in all aspects of people daily lives, including: E.g. Emergency detection, surveillance/tracking of target-of interest, evacuation purposes, and many other location-based services.

Prediction techniques that are currently used do not consider the motivation behind the movement of mobile nodes and incur huge overheads to manage and manipulate the information required to make predictions. User's mobility prediction is an important maneuver that determines the location of the user in the network by the manipulation of the available information about the user's activity. The prediction accuracy depends on the user mobility model and the prediction methodology. Many models assume a basically random movement of the user. While this is sufficient to simulate the performance of network level protocols. To overcome such limitations we propose in this paper an extension of the Activity based Mobility Prediction algorithm using Markov modeling (AMPuMM) [1].

II. HISTORY

1. BACKGROUND

- Aim is to predict the future location of node.
- The problem of modeling human location histories for predicting the next place to be visited, using a very simple approach based on Hidden Markov Model.
- Evaluating the limitations of on real world data.

2. Literature Survey

Many previous works have addressed the issue of computing with spatial trajectories. Moreover, several previous works have specifically focused on the analysis of human location histories, concluding that human trajectories show a high degree of temporal and spatial regularity, following simple and reproducible patterns. In brief we have previously proposed methods for the analysis of location histories that can be classified, according to the manner by which data are modeled, into three general distinct approaches namely:

1. State space model:

State-space models attempt to capture the variation in spatial sequences through sequence models such as generative Hidden Markov Models HMMs), discriminative Conditional Random Fields (CRFs), or extensions of these two well-known approaches. Generally, these models have been used successfully in dealing with uncertainty (i.e., they generalize well), but they also suffer from High training complexity. In the case of location prediction, generative approaches such as HMMs can naturally been used, since they support the generation of possible future visits and the estimation of an associated probability [2].

2. Data Minnig Model:

Data mining techniques, on the other hand, explore frequent patterns and association rules, by defining a trajectory as an ordered sequence of time-stamped locations, and using sequence analysis methods such as modified versions of the Apriori algorithm. Most previous data mining methods attempt to maximize confidence with basis on previous occurrences (i.e., they do not generalize as well as state space models), and they often do not consider any notion of spatial or temporal distance [2].

3. Template Matching Technique:

The third type of approaches, which are based on template matching, compare extracted features to prestored patterns or templates, using similarity metrics specific for sequential or time-series data. These similarity metrics include dynamic time wrapping and other sequence alignment approaches that are essentially variations of the edit distance computed between the sequences (e.g. edit distance with real penalty or edit distance on real sequence). They also include algorithms based on the longest common subsequence, or even other heuristic algorithms similar to those used in more traditional string matching problems. Template matching techniques have also been reported to have issues with high runtime complexity, noise intolerance, or in dealing with spatial activity variation [2].

III.PROPOSED SYSTEM

This paper proposes a simple method for predicting the future locations of mobile individuals, on the basis of their previous visits to other locations, and leveraging on Hidden Markov Models for capturing the patterns embedded in previously collected location histories are first clustered according to their characteristics (i.e., according to the temporal period in which they occurred). Given a new sequence of visits, from which we want to discover the particular location that is more likely to be visited next, we start by finding the node that is more likely to be associated to the particular sequence of visits being considered in the prediction task, and then we use inference over the corresponding HMM in order to discover the most probable following location [2].

IV.SYSTEM DESIGN

In activity-based modeling a typical daily user behavior is characterized as sequences of user activities derived from a set of parameters. The model types can be distinguished by the way it illustrates the user's decisions of when and how an activity is carried out. An activity-based user-centered approach to various types of wireless networks is presented. This model derives an integrated view on mobility and network usage from a user's real-world activity perspective. It is based on the results of the users decisions and activities and enables their executions by connecting the locations of the consecutive activities [1].
The main idea of the model is presented in Fig.1

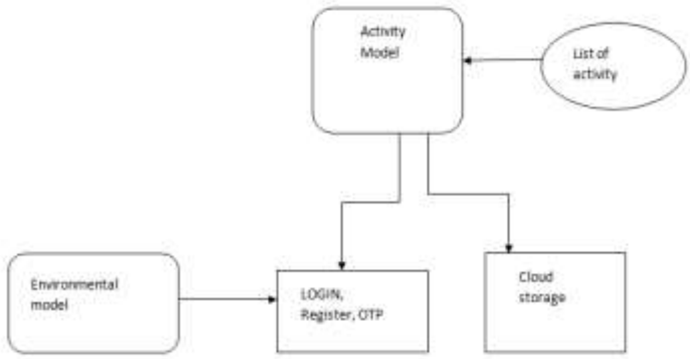

Fig.1.Architecture of Hidden Markov Based System model

The Hidden Markov Model consist of following 2 modules:
1. Activity Model
2. Environmental Model

The main aim of the activity model is a transformation of an abstract list of possible non-networking activities into a concrete activity schedule. The activity model is used mainly for the calculation of the concrete activity schedules for a user [1].
In Environmental Model, We will predict the location of user on geographic areas by logging into Geo-fence.

V.RESULTS AND ANALYSI

1. Test cases and Result
1. Test case for LOGIN

Test Case ID	Test Case	Expected Result	Actual Result	Test Result
1	Enter Voice input	User enters in Application.	User enters in Application.	pass

2. Test case for adding geo-fense:

Test Case ID	Test Case	Expected Result	Actual Result	Test Result
1	Enter Geo-Name, Longitude and Latitude and radius.	Geo-Coordinates getting automatically from GPS satellite and user enters Name and radius	Sometimes GPS coordinates not getting.	Pass

3 Test case for deleting geo-fense:

Test Case ID	Test Case	Expected Result	Actual Result	Test Result
1	User will delete individual and all.	Geo-fence deleted successfully	Geo-fence deleted successfully	Pass

4. Test case for Notification:

Test Case ID	Test Case	Expected Result	Actual Result	Test Result
1	System will send Email	Email will send successfully on registered email.	Email sent successfully.	Pass
2	System will send SMS	System send SMS	System send SMS via GSM.	Pass

1. Analysis with Snapshots:

In fig 2, an administrator first login in to the system by entering his name, mobile number ,email id and then he will authenticate through speech to text, then admin will be the authenticated user. If he is not valid then the message should be displayed saying that not valid. If he is valid then the page should be displayed that he can login his own profile.

Fig 2: Snapshot for Authentication

In fig 3, the student will add his location of geofence latitude, longitude, distance and also mention a profile for it from above three:

1. Ringing
2. Vibrate

3. Silent
then all the will be send to admin by which he can predict the location.

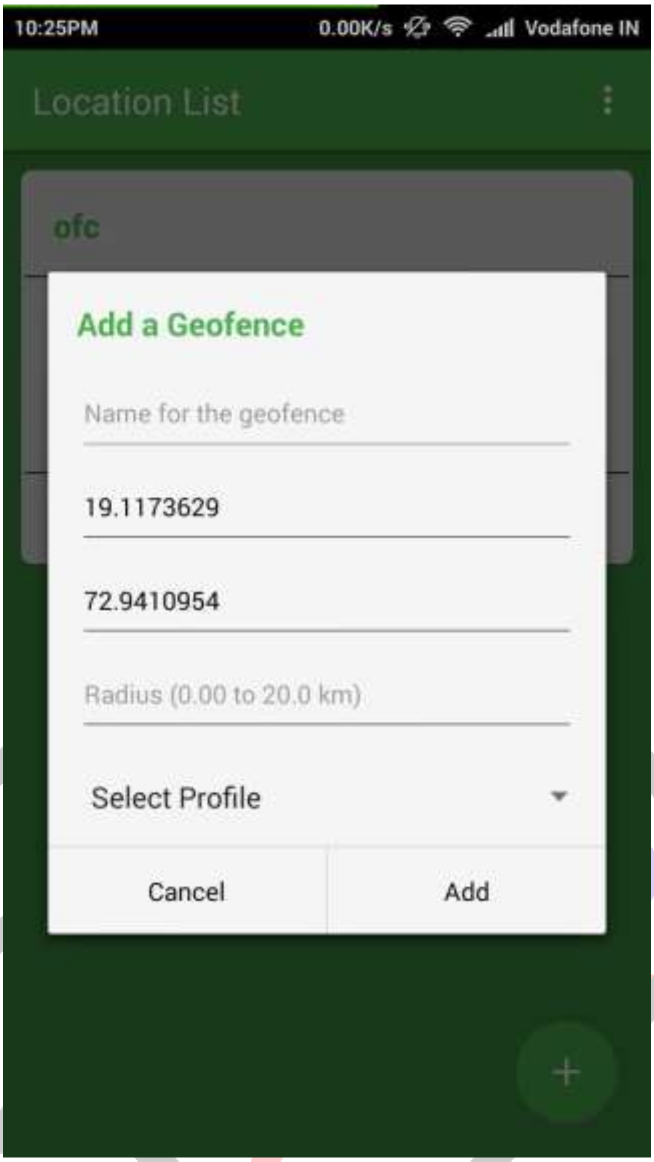

Fig 3: Snapshot for Adding a Geofence

In fig 4, all the data of student will be transfered to cloud storage and then it can be viewed to the admin by which he can predict the location the student. Also we can add a new geofence or delete a geofense and then LOGOUT from the system.

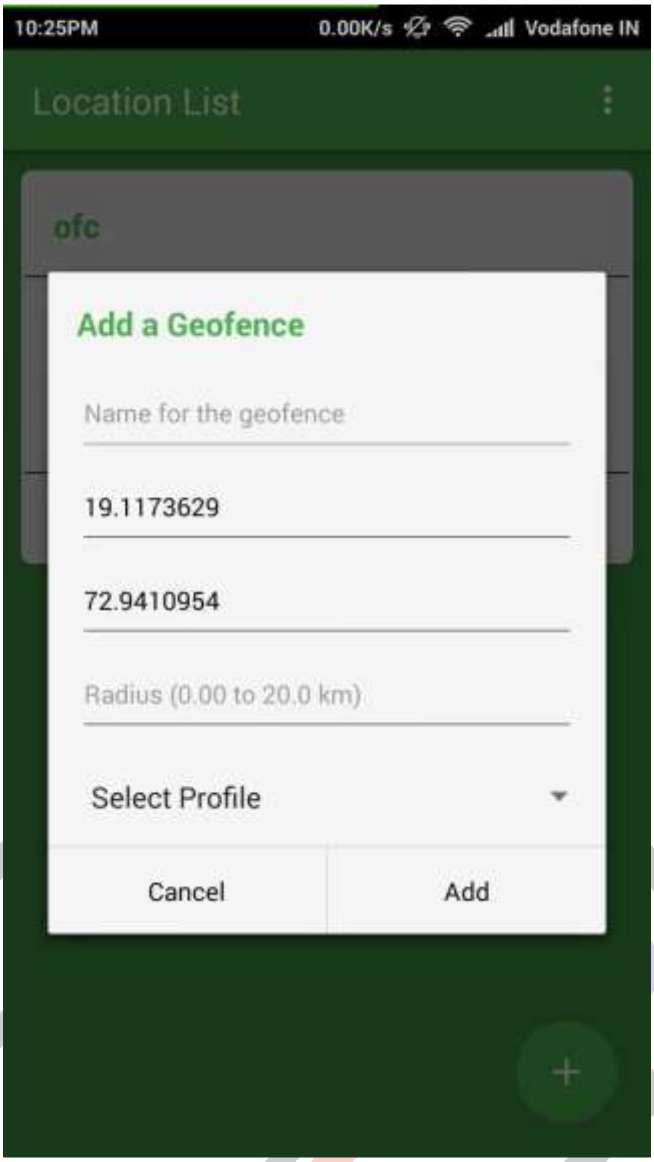

Fig: Geofence List

CONCLUSION AND FUTURE SCOPE:

We presented novel prediction models for moving objects designed for imprecise data. We first modeled the problem with a HMM and then refined it to improve quality of the results and execution times [3]. Then, we developed an activity-based continuous time Markov model to define and predict the human movement patterns using three Geofence events: Entry, Exit, and Dwell Time. We formally proved a coherence of our model with Activity-based user's Mobility Prediction using Markov Modeling purpose. The limitation of this model is that it cannot predict the location of node while node is not in range

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