Motivation

- Traffic condition in our country is getting worse, which is costing us time & money.
- The capital is losing Tk 120 billion for the delay of the passengers who suffer in traffic.
- It's also losing Tk 40 billion in the area of trade and exports, Tk 25 billion for environmental causes.
- We developed a technique that will help traveller to plan their travel to avoid congestion.

Goals

- Leverage mobile crowd power to collect traffic data.
- Predict travel time for any source-destination for any time period.
- Visualize traffic and travel time in Google Maps accessible from PC and mobile.

Framework

- Android app is used for collecting GPS data.
- GPS data is later uploaded to central database.
- Server side processes GPS data using prediction algorithm to calculate travel time, travel pattern, traffic color map.
- Users can communicate with these services through a website.

Client Side Approach

- The android app[4] starts a background service which collects GPS trajectories and the timestamp and saves it in its database.
- The user can see his trajectories for different time range in the map.
- The user can upload his collected data to a server where further processing is done.
- Please download our app[4] to contribute data.

Server Side Approach::Road segment mapping

- Road segments are defined as a portion of a road with no road emerging from it.
- Road segments of different areas will be stored initially using their end points (eg lat, long). Mid points of a road segment at particular interval are also stored initially.
- For every GPS point an approximate location is found using Reverse geocoding method.
- When a location is identified, the mid points of nearby road segment are checked to find a point which is closer to our given latitude-longitude. If its less than a threshold value, then the road segment for that point is identified.
- Thus point density of every segment is calculated from GPS points.

Server Side Approach::Traffic Color Map & Travel Time Prediction

- Point density for each segment dynamically changes for every uploaded GPS data.
- According to density each segment is put on different classes based on predefined values based on day, time, vehicle.
- Finally each class of segments are given a color to visualize a traffic condition.

Challenges::Data Collection

- Sometimes it takes a long time to connect to satellite after running the app.
- The device needs to be connected to satellite before driving is started or the person carrying it starts moving.
- Device must be used outdoors with a clear view of sky where no tall buildings or trees are too close.
- High battery consumption for using GPS.

Challenges::Prediction Algorithm

- Matching collected data to specific roads with no approximation error is a big challenge.
- For prediction of travel time or route, every road segment combination of specific area needs to be checked. Which can lead to exponential solutions. So, finding an appropriate heuristic for searching is a research challenge.

Reference

1. www.thefinancialexpress-bd.com/more.php?news_id=142734&date=2012-09-09
3. en.wikipedia.org/wiki/Reverse_geocoding

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