

GEOM90007 A3 Major Project Patter Report

Haoyu Pang 744692 Cheng Li 788552 Fumi Wu 744870 Kaiming Sun 763821

Introduction

In this assignment, our group chose GeoLife GPS Trajectories data from Microsoft Research Asia to analyse the daily movements in Beijing, mainly focus on the transport mode analysis and stay point analysis. Based on the data, our group tried to reveal the following patterns in our interface. Our target users are the officers of government scientific agency charged in urban planning and development, as well as the researches who are interested in social behaviours and travel pattern analysis. It can also be used as guideline in tourism to plan the tours covering interest places.

Patterns analysis

1. Travel patterns

Because we have designed a time slider, it is easy for users to observe pattern in different time period. There are two major patterns, one is the rush hours on weekdays and weekends are different and another is the travel directions vary during weekdays. In the morning on weekdays between 8:00 AM and 9:00AM, we can observe a large number of dot points moving from northern areas to the inner city by buses. From 9:00AM, many cars are moving from eastern suburbs to the inner city. While around 6:00PM to 7:00PM, many people are traveling from inner city to suburbs. The explanation for these patterns would be that many Beijing citizens live in the suburb and work in the city, so they need to ride to city by different means of transportation on weekdays during morning. On weekends, there is no clear pattern showing the exactly destination where Beijing residents are heading to during that period of time. The movement on weekends is more likely to be evenly distributed around the city. Considering the rush hours, it is clear that between 8:00AM and 9:00AM, there are not much people traveling around, which is contrast to that time on weekdays, and while between 12:00PM and 1:00PM, there is lots of travelers. Meanwhile, on weekend, they travel randomly to entertain on weekends.

2. Transport usage patterns

The star plots indicate that in the morning (8:00AM) of weekday, the preferable transport modes are walking, riding bikes and taking buses, while on weekend at the same time, the proportion of driving cars increase. In the evening (7:00PM) of weekday, the first three kinds of transportation are walking, riding bikes and taking buses, while on weekend at the same time, the first three transportations are walking, taking buses and riding bikes. Therefore, user can improve the arrangement or timetable of the public transportation based on the transportation changes between weekday and weekend.

3. Stay point patterns

We can find some regularity from the distribution of points on the maps: most points in campuses of universities and parks are walking and riding bikes. The reasons are the environments of these places are better than others and the roads and instruments in these places are friendly to walkers and riders.

The clusters of stay points show that people spend a long time on weekends in

- University: This may indicate that the majority of users being tracked are students, who study and live in the university. If not, this pattern represents that these universities are worth travelling.
- Airport: Waiting for airplanes usually takes a long time.
- Parks: The clusters show some popular parks, like Beihai Park, Dongxiaokou Forest Park and Summer place.

Critical Analysis of Data

The points mainly distribute in the northern part of Beijing, where there are more universities and Information Technology working places, so, we can assume that the position recorders in Beijing are mainly students and IT workers. There are no GPS signals underground; therefore, most recorders cannot record their positions successfully. However, taking subway is one of the most popular transportations in Beijing. Hence, the data cannot show the percentage of taking subways accurately.