



## When Big Data Meets YouBike

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### 1. Background

Over the last few years, Taipei YouBike has been playing an important role in alleviating traffic congestion, reducing pollution and improving health of citizens. With the proceeding of smart city and open data movement driven by Taipei government, real-time YouBike transaction data has been released for open download. Using big data analysis technologies, our team strive to visualize, analyze and exploit extra values inside data.

### 2. Targets & Motivation

- Calculating YouBike facility utilization for each station
- Visualizing YouBike real-time circulation data in a day
- Providing real-time YouBike service data for the public
- Analysing traffic flow in various city blocks

### 3. Methods and Tools

- Data Collection: retrieve real-time YouBike transaction data from Taipei open data platform and extract interested columns for later use
- Data Processing & Analysis: R language is used as main data processing tools. For each station, we draw YouBike loan amount for one day to analyze its utilization condition
- Data Visualization: various websites are built for presenting YouBike facility service data, live YouBike loan map and YouBike traffic heat map. The websites(<http://140.138.77.104/hackerekcah/>) are built with apache, php5 and in the framework of Google Maps Javascript API3.

### 4. Results

#### 4.1 YouBike Loan Amount

By collecting real-time YouBike transaction data for one day, we obtained the YouBike loan amount for 326 stations for a whole day(6am to 24pm). From these figures, we could clearly observe the utilization situation for each station.

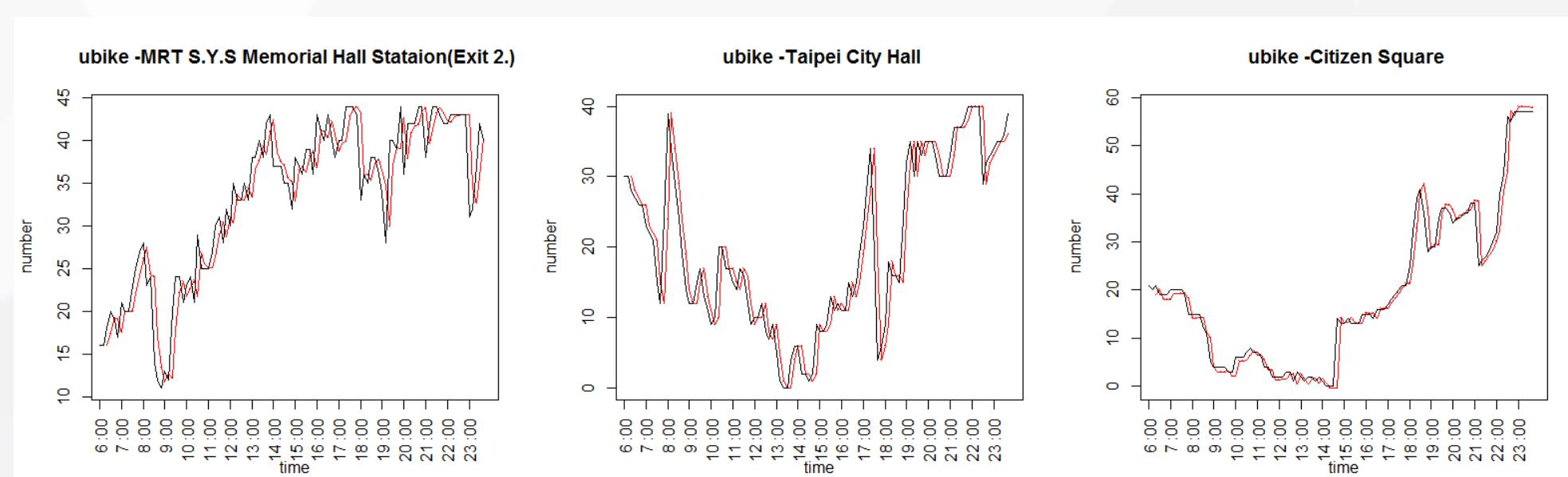


Figure 4.1 YouBike loan amount for various stations in one day

#### 4.2 YouBike Facility Service Map

With the popularization of YouBike, situations where parking slots are hard to find or bikes in one location are used up become common, which causes trouble for citizens who are going to returning or borrowing bikes.

To address this issue, our team built a simple website for citizens to check parking slot and bikes available in any station any time.

#### 4.3 One day of YouBike

To help citizens and government get a brief impression of the YouBike circulation situation in each station and how YouBike interacts with citizens, we build a website to show lively the amount of YouBike in use. The size of the circle represents the loan amount; Red color indicates the increasing of loan amount while blue represents the decreasing of loan amount.

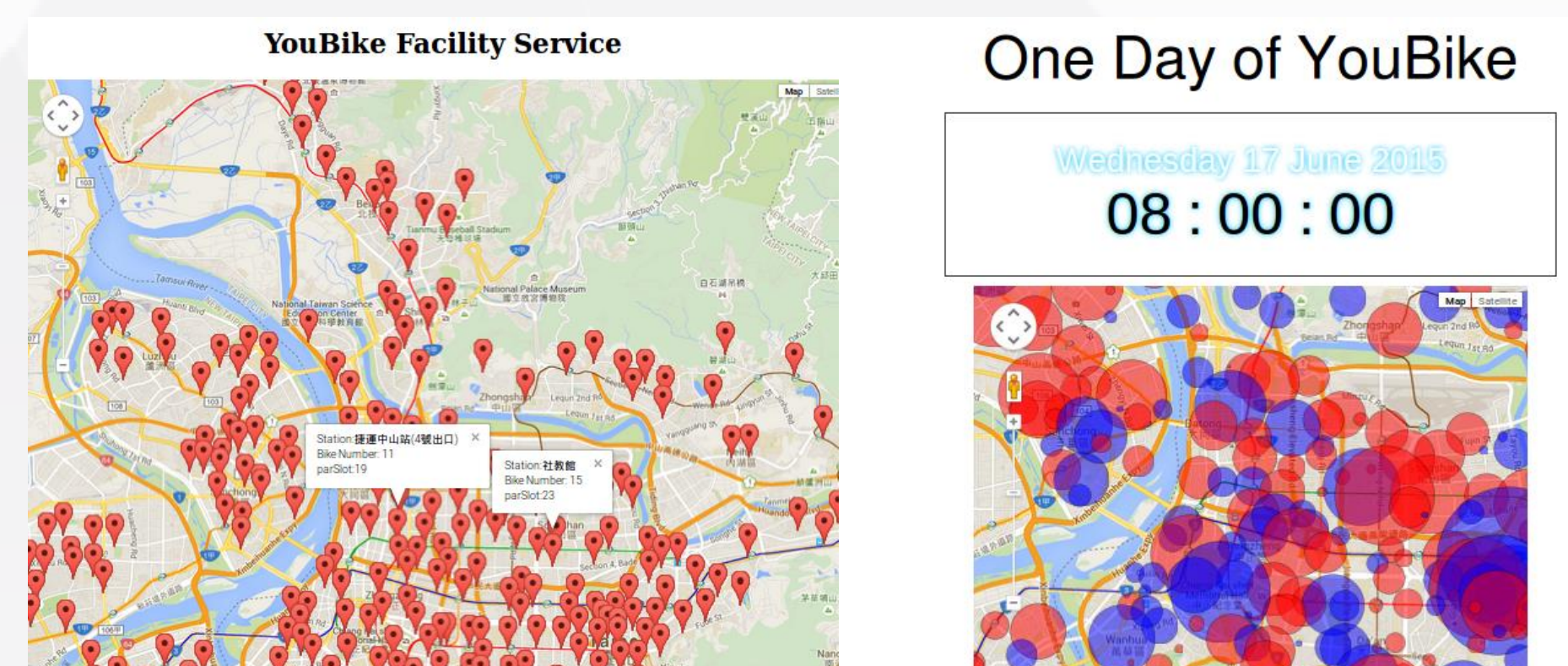


Figure 4.3 a). website shows YouBike facility service map  
b).website shows real-time YouBike traffic loan map

#### 4.4 Real-time YouBike Loan Map

The figures below show the website in different times of a day. These figures vividly show how many people are returning and borrowing bikes. The size and color animation rate indicates the activeness of each station. And through these figures, we could catch a rough idea of city life.

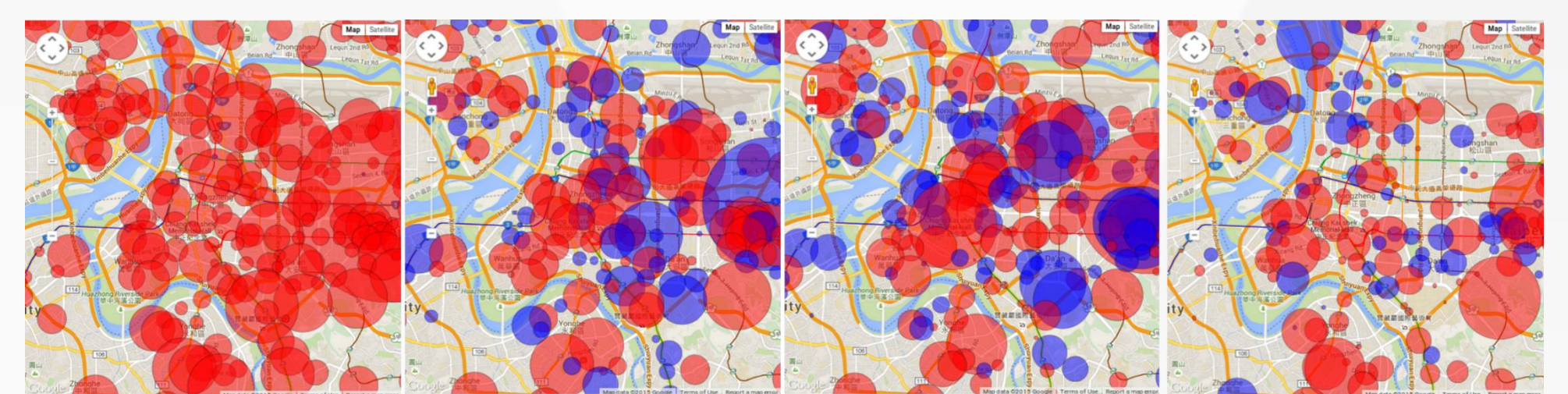


Figure 4.4 Real-time YouBike traffic loan map in various time

#### 4.5 Youbike Traffic Heat Map

By combining the location of each station and the number of people borrowing or returning bikes, we could draw a heat map to show the activeness of each station and area nearby. The top-left figure shows the original satellite google map of Taipei and the rest shows the heat map in different color gradient and radius.

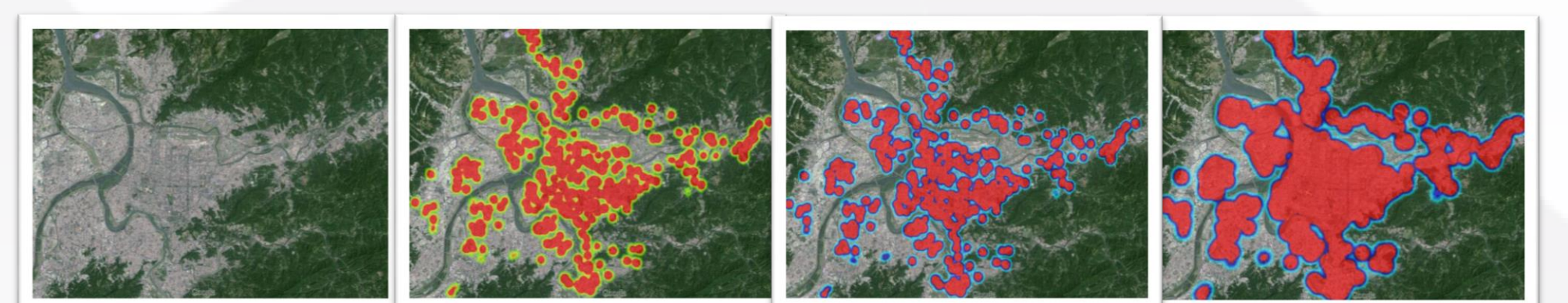


Figure 4.5 YouBike traffic heat map in various gradient and radius

### 5. Conclusions

Through this project, by visualizing and analyzing YouBike transaction data in different maps and figures, we present the service condition and utilization of YouBike for government as well as citizens. We could see that big data not only provides us a powerful weapon to analyze data but also provides us a fresh new perspectives of inspecting and observing city life.