

# User Documentation Demo 2

## Group 2

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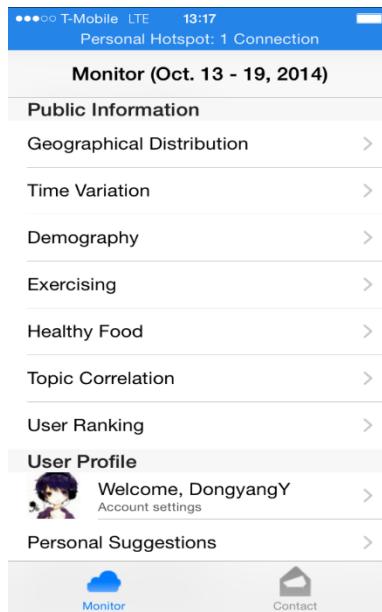
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In this document, we will tell you, the user, to the mobile apps and the website, and explain how to use it. Our goal is to help users monitor the overall health related information of the American people from different aspects and get health related suggestions. The data we use here is a week data, from Oct. 13 to 19, crawled from the Twitter database.

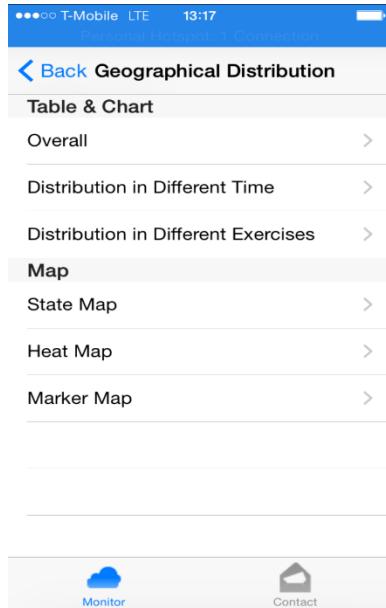
## 1.1. IOS Application

When you first navigate to the page, you will encounter the following screen:



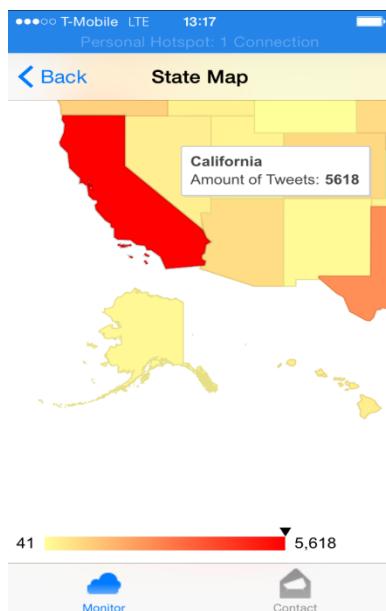
**Figure 1-1. Monitor**

In Figure 1-1, this interface contains two list views, “Public Information” and “User Profile”. Each item in the “Public Information” list shows the specific analysis of the public who are tweeter users. Each item in “User Profile” list shows analysis concerning user’s own tweet data. If you click the Geographical Distribution, this app will navigate you to the next screen:



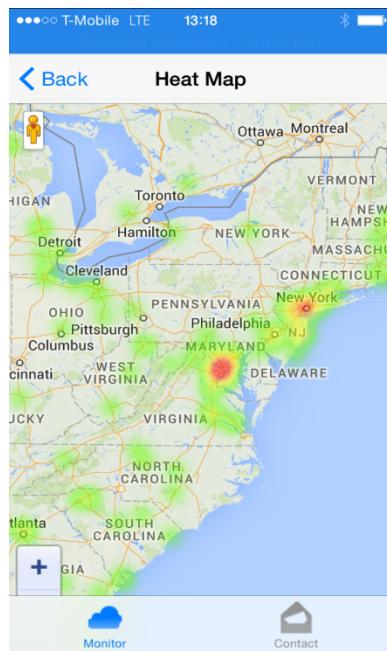
**Figure 1-2. Geographical Distribution**

In Figure 1-2, this interface contains a sub menu in which each item contains analytical information concerning the exercise intensity, distribution of the public. In the geographical distribution, you can see the amount of tweets in different locations such as a state map as below:



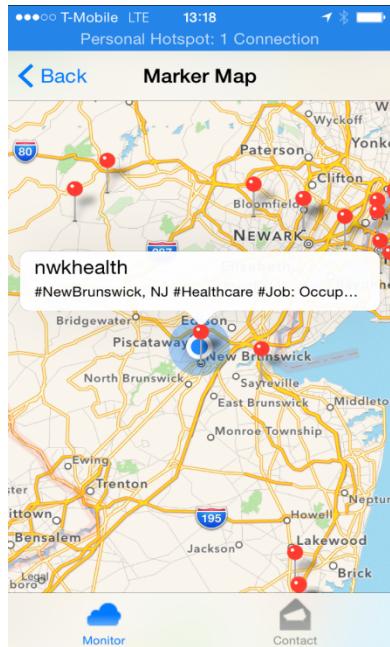
**Figure 1-3. State Map**

In Figure 1-3, this interface shows a US map in which each state contains information of the amount of tweets concerning exercise and health. The more the number of tweets being tweeted, the darker the color of the certain state will be. Thus California has the most amount of tweets. You may also see a heat map as below:



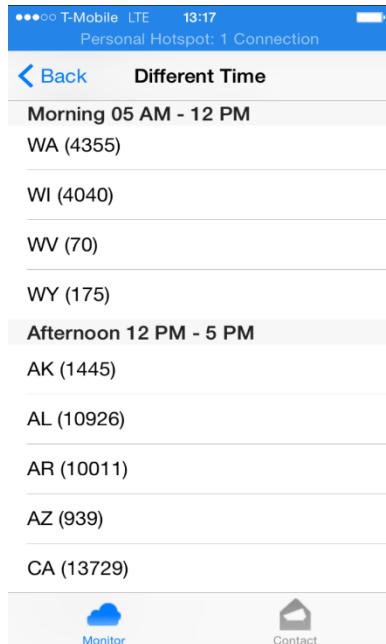
**Figure 1-4. Heat Map**

In Figure 1-4, when the color is closer to red, the amount of tweets is larger. You may also see a maker map as below:

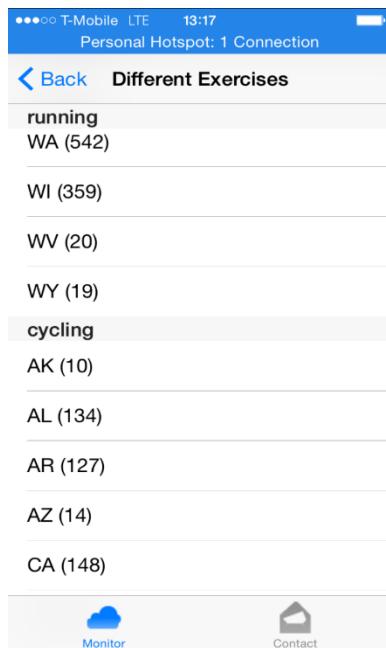


**Figure 1-5. Marker Map**

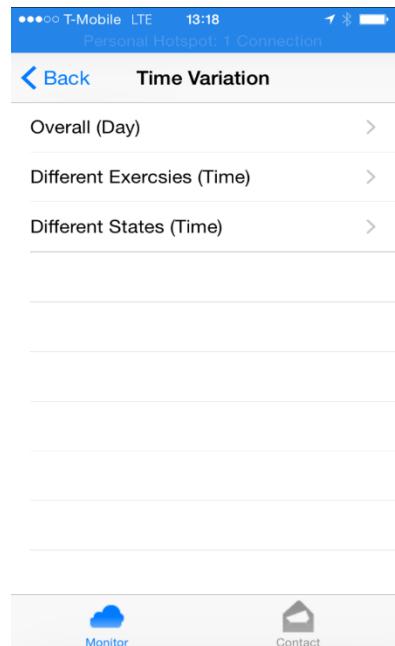
In Figure 1-5, this interface shows a Google map where marks will be showed on it if users post their tweet with location info. The interface will pop out certain user's name and his tweets if a single mark is clicked. You can see the recent health tweets around you, such as this figure above. Besides, we are willing to support you to see that information in different time period in a day and in different exercise types.



**Figure 1-6. State Tweets by Different Time**



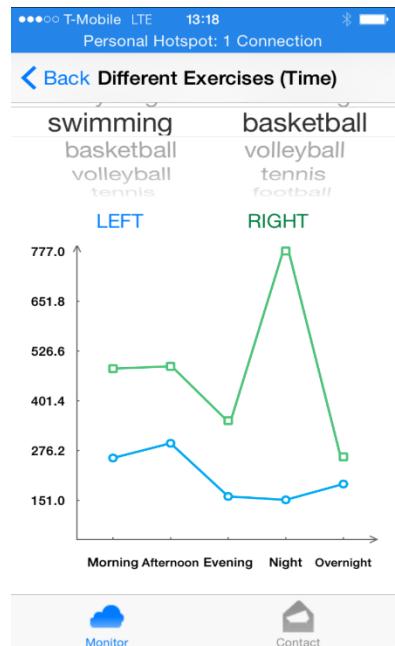
**Figure 1-7. State Tweets by Different Exercise**



**Figure 1-8. Originally: Time Variation**



**Figure 1-9. Trend of the week**

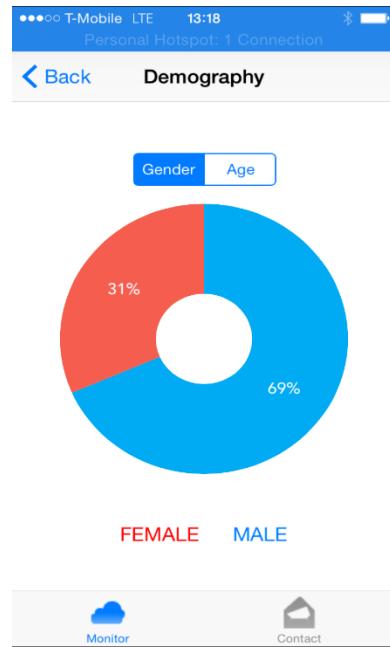


**Figure 1-1. Trend by Different Exercise**

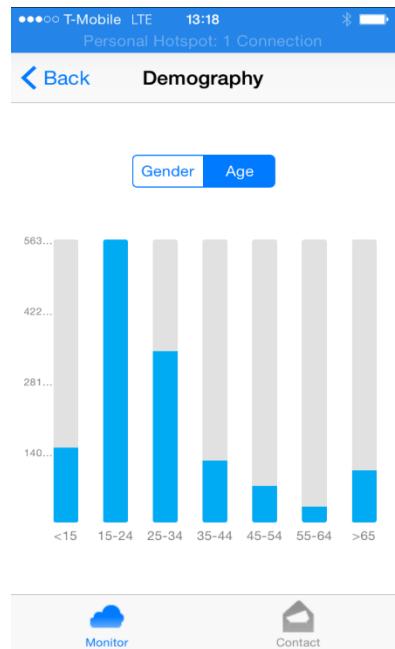


**Figure 1-11. Trend by Different States**

In the time variation, you may see the trend based on different days in Figure 1-9, and based on different time periods in different exercises in Figure 1-10, you can compare them like this. We also have states classification in Figure 1-11.

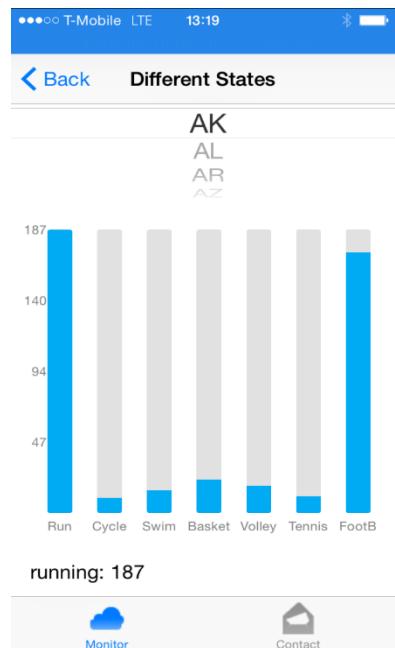


**Figure 1-12. Gender Distribution**

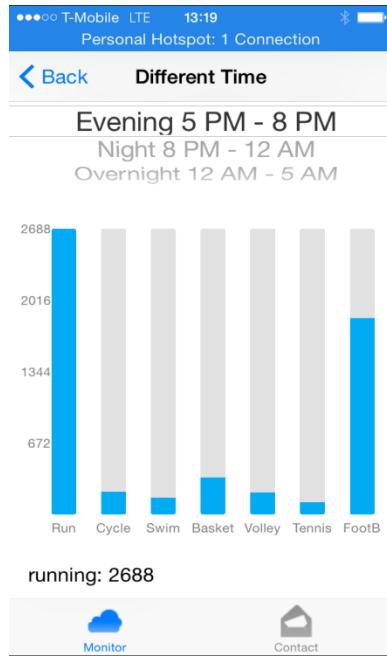


**Figure 1-13. Age Distribution**

In the demography, we have overall gender distribution in Figure 1-12, and age distribution in Figure 1-13.



**Figure 1-14. Exercise Classification by Different State**

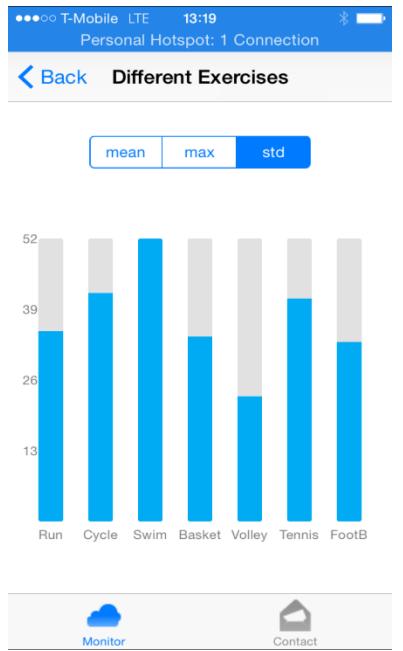


**Figure 1-15. Exercise Classification by Different Time**

In the exercising classification, you still can see the amount of tweets in different states in Figure 1-14 and time in Figure 1-15, you can touch the bar to see the detail.

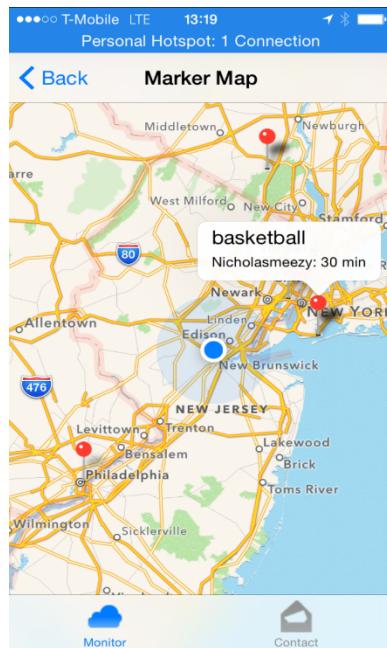


**Figure 1-16. Exercise time by Different State**



**Figure 1-17. Exercise time by Different Types**

Also, you can see the average, maximum, and individual difference of exercising time duration in Figure 1-16. This interface displays a bar chart of the “mean”, “max” and “standard deviation” of exercise duration time varied by different exercise types in Figure 1-17.



**Figure 1-18. Exercise Marker Map**

In Figure 1-18, we also have a marker map here. This interface shows markers on the map for users who have tweeted a tweet concerning exercise and mentioned his exercise duration time. Once the marker is clicked, the interface will pop out the duration time and the exercise type on the top of the marker. For example, a person called Nicholasmeezy has just played basketball for 30 minutes.



**Figure 1-19. Exercise Frequency Estimation**

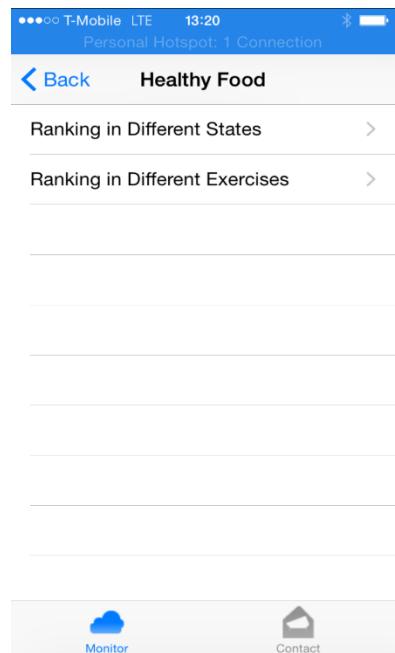
We also have exercising frequency estimation in Figure 1-19.

In the sentiment state map, you can see the mood when people are exercising in Figure 1-20. For example, Alaska's mood value is the average.

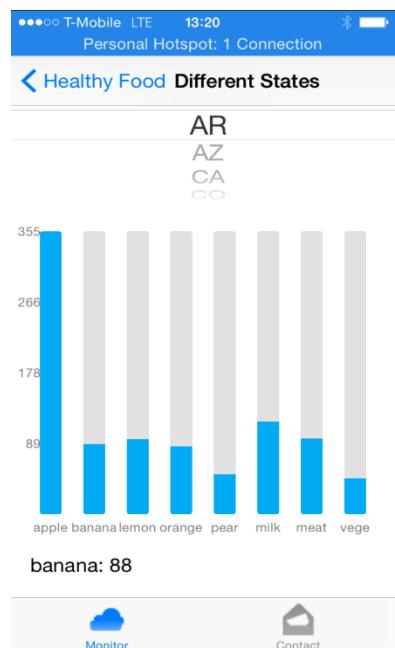


**Figure 1-20. Sentiment State Map**

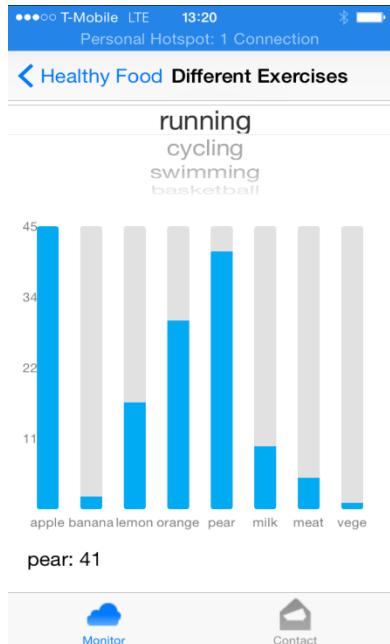
In Figure 1-21, this interface includes the analysis of healthy food, sorted by either different states or different exercise. For example, in Arizona people like apple most in Figure 1-22 and in the running type people like apple and pear most in Figure 1-23.



**Figure 1-21. Healthy Food**



**Figure 1-22. Food Analysis by Different State**

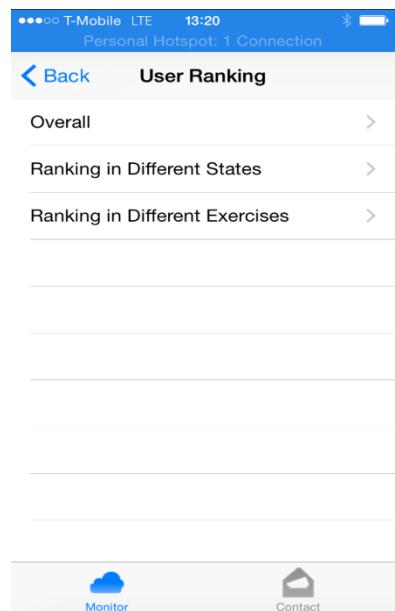


**Figure 1-23. Food Analysis by Different Exercise Types**

In Figure 1-24, this interface shows topic correlation between exercise and health, exercise and fruit, health and fruit. For instance, from the figure below you may see the amount of tweets about health is positive correlated with the amount of tweets about exercise.

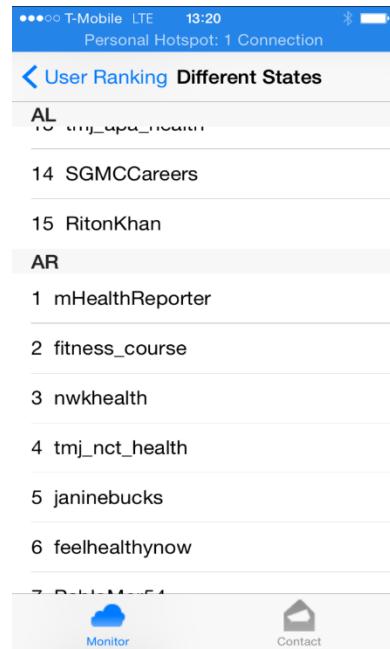


**Figure 1-24. Topic Correlation**



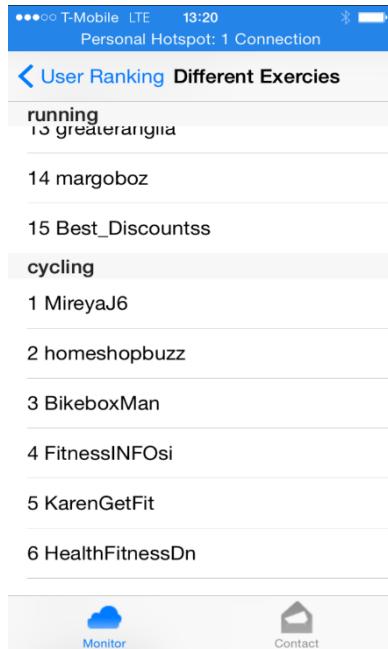
**Figure 1-25. User Ranking**

In Figure 1-26, this interface displays the ranking list of the users who exercise the most often in different states.



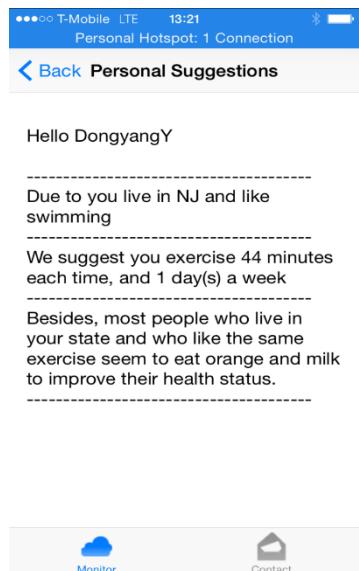
**Figure 1-26. User Ranking by Different States**

In Figure 1-27, this interface displays the ranking list of the users who exercise the most often in different exercise types.



**Figure 1-27. User Ranking by Different Exercise**

In Figure 1-28, in this interface the users can see an analysis of their personal exercise history. Personal exercise duration, average level in area and the difference can be shown.



**Figure 1-28. Personal Suggestions**



**Figure 1-29. Health Tweet History**

In Figure 1-29, this interface shows the history of user tweets related about Health.

## 1.2. Website

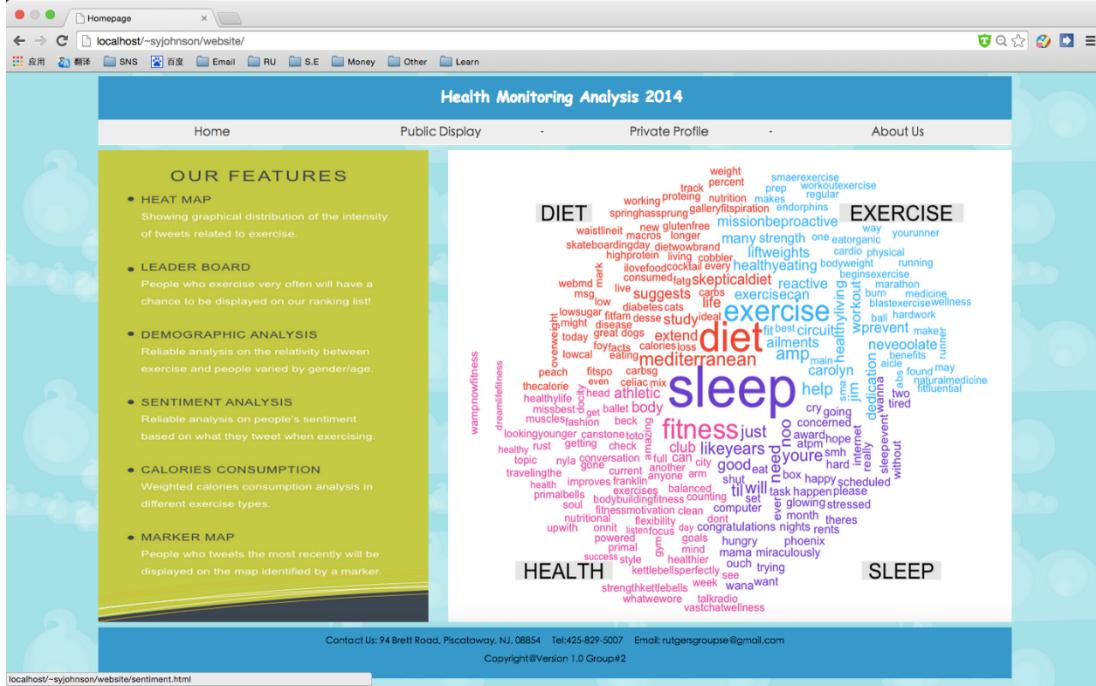


Figure 1-30: Homepage of the website

In the Figure 1-30, this interface shows the homepage of our project website. You can see there are four section: Home, Public display, Private profile and About us. What's more, you can see our features on the left as well. You may click any of them if you are interested in.

**Health Monitoring Analysis 2014**

- Home
- Public Display
- Private Profile
- About Us

### OUR FEATURES

- HEAT MAP  
Showing graphical distribution of the intensity of tweets related to exercise.
- LEADER BOARD  
People who exercise very often will have a chance to be displayed on our ranking list!
- DEMOGRAPHIC ANALYSIS  
Reliable analysis on the relativity between exercise and people varied by gender/age.
- SENTIMENT ANALYSIS  
Reliable analysis on people's sentiment based on what they tweet when exercising.
- CALORIES CONSUMPTION  
Weighted calories consumption analysis in different exercise types.
- MARKER MAP  
People who tweets the most recently will be displayed on the map identified by a marker.

### HOW WE MAKE OUR ANALYSIS

In today's world, people like sharing their moments and personal activities on the internet. It's a natural trend in this information society. As a result, an increasing number of Social Network Services are under development, such as Facebook, Google+, Twitter, etc. With the help of the large amount of users from these SNS, we are able to make reliable analysis on issues relating to health and exercises, based on the public data provided by these users.

Using data collected from Twitter, we are able to find how the intensity of different types of exercise distribute in different states of this country, what are people's attitudes towards exercise according to their age and gender, what suggestions we should give out to people in different health status. Besides these analysis, there are many other valuable features which you will find doing good to your body and improving your health status if you try our product!

Contact Us: 94 Brett Road, Piscataway, NJ, 08854 Tel:423-829-5007 Email:rutgensgroup@gmail.com  
Copyright@Version 1.0 Group#2

**Figure 1-31: About Us**

In the Figure 1-31, this interface you may see our project mainly features such as Heat Map, Leaderboard, Demography Analysis, Sentiment Analysis, Calories Consumption, Marker Map and how we make our analysis.

**Health Monitoring Analysis 2014**

- Home
- Public Display
- Private Profile
- About Us

### OUR FEATURES

- HEAT MAP  
Showing graphical distribution of the intensity of tweets related to exercise.
- LEADER BOARD  
People who exercise very often will have a chance to be displayed on our ranking list!
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Weighted calories consumption analysis in different exercise types.
- MARKER MAP  
People who tweets the most recently will be displayed on the map identified by a marker.

### Geographical Distribution

### Time Variation

### Demography

### Exercising Type

### Healthy Food

### Correlation

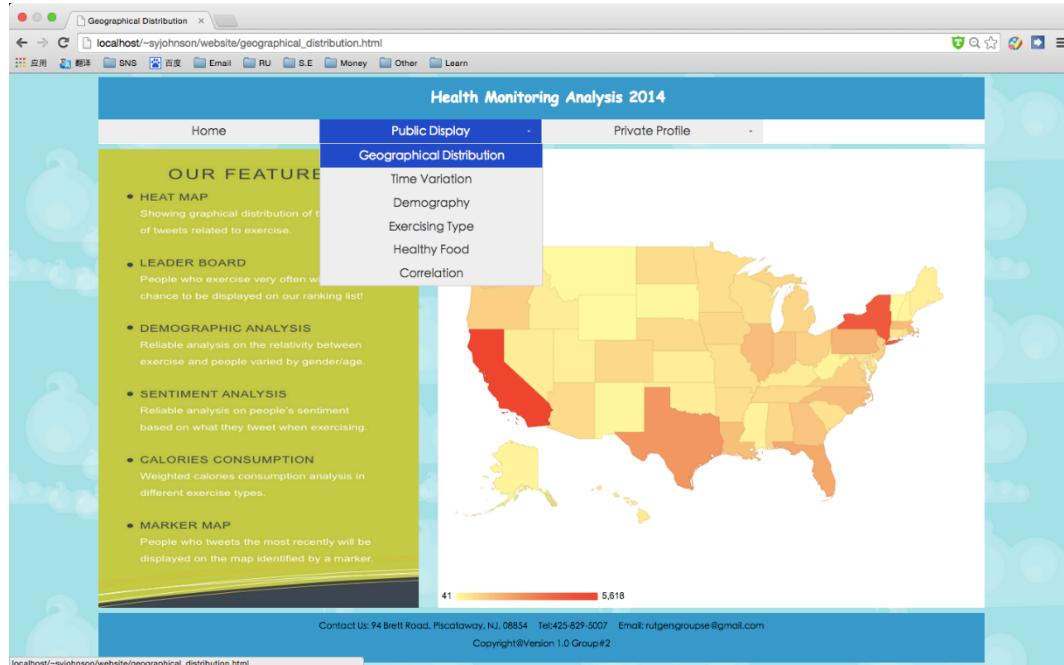
### HEALTH

### SLEEP

Contact Us: 94 Brett Road, Piscataway, NJ, 08854 Tel:423-829-5007 Email:rutgensgroup@gmail.com  
Copyright@Version 1.0 Group#2

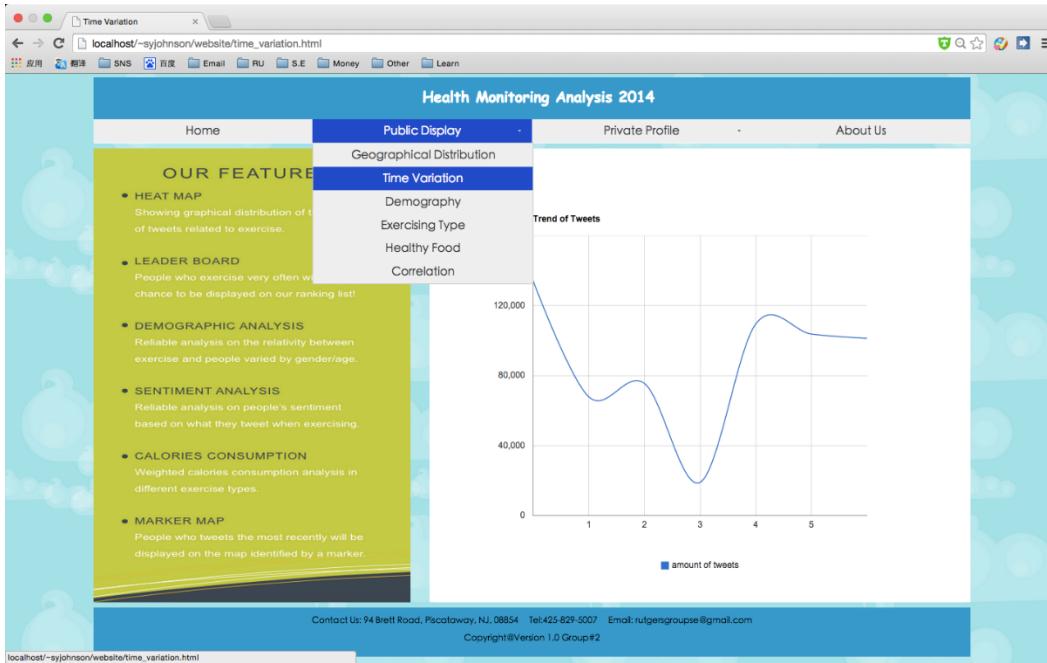
### Figure 1-32: Public Display

In the Figure 1-32, when you click the “Public Display” button, you may see the different features such as Geographical Distribution, Time Variation, Demography, Exercising Type, Healthy Food and Correlation. You can click any of them if you are interested in.



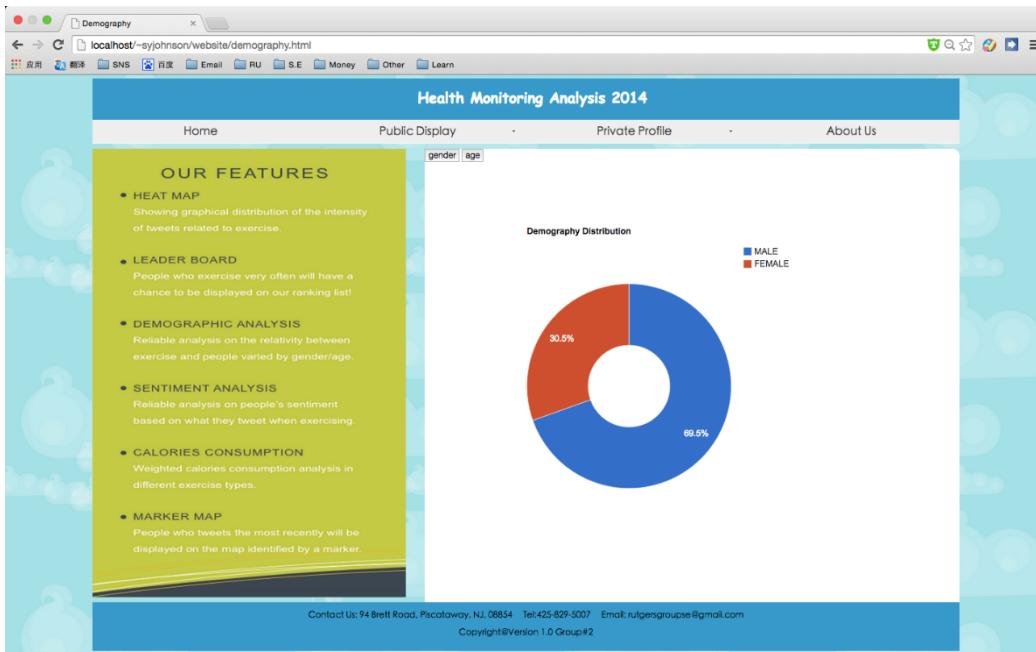
### Figure 1-33: Geographical Distribution

In the Figure 1-33, when clicking on this button of geographical distribution, you can see the amount of tweets in different locations such as a state map. This interface shows a US map in which each state contains information of the amount of tweets concerning exercise and health. The more the number of tweets being tweeted, the darker the color of the certain state will be. Thus California has the most amount of tweets.



**Figure 1-34: Time Variation**

In the Figure 1-34, when clicking on this Time Variation button, you may see the line chart of the exercise tendency in different exercise types as time goes by.



**Figure 1-35: Demographical Analysis by gender**

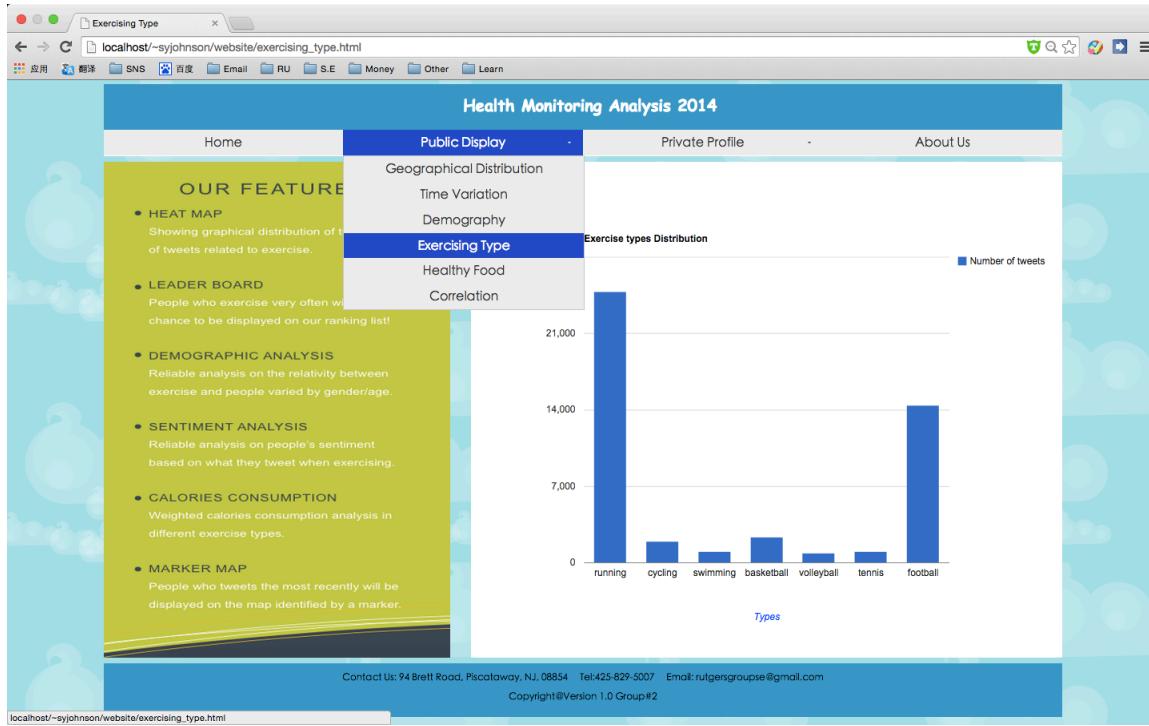
In the Figure 1-35: when clicking on the Demographical Analysis button, you

may see the demographical distribution by gender.



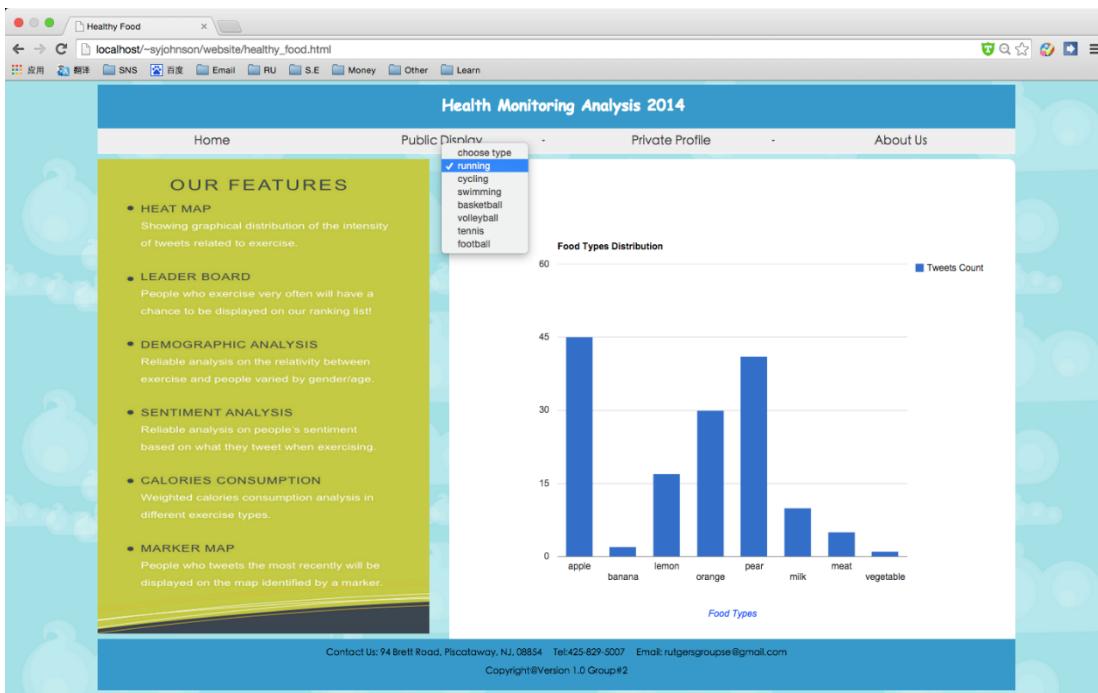
**Figure 1-36: Demographical Analysis by age**

In the Figure 1-36: you can also click the age button to see the demographical distribution by age.



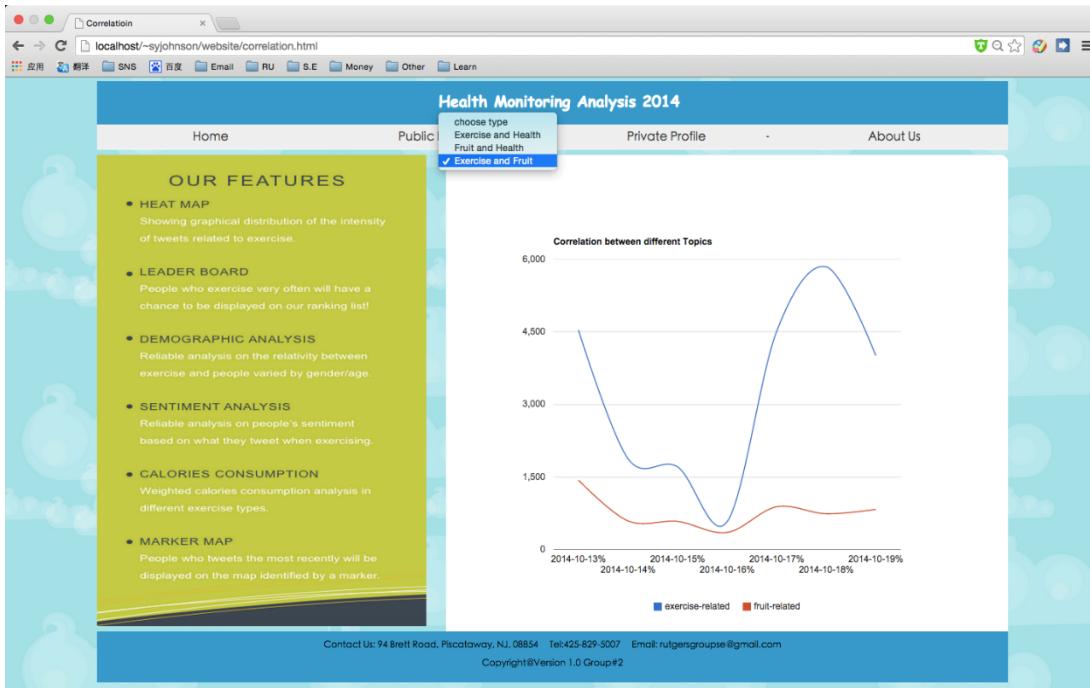
**Figure 1-37: Exercising Type**

In the Figure 1-37, when clicking on the Exercising Type button, this interface shows the comparison of different exercise type varied by the related amount of tweets



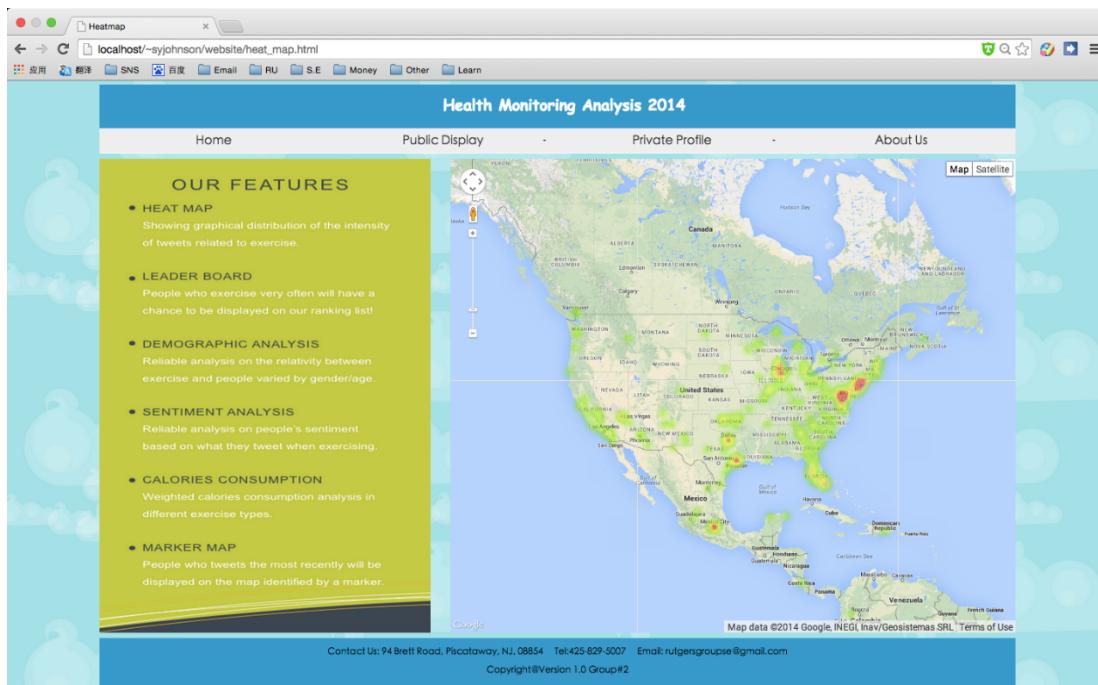
**Figure 1-38: Healthy Food**

In the Figure 1-38: when clicking on the Healthy Food button, the interface shows the analysis of healthy food, sorted by either different exercise type. For example, when you choose the running type, you may see in the running type people like apple and pear most.



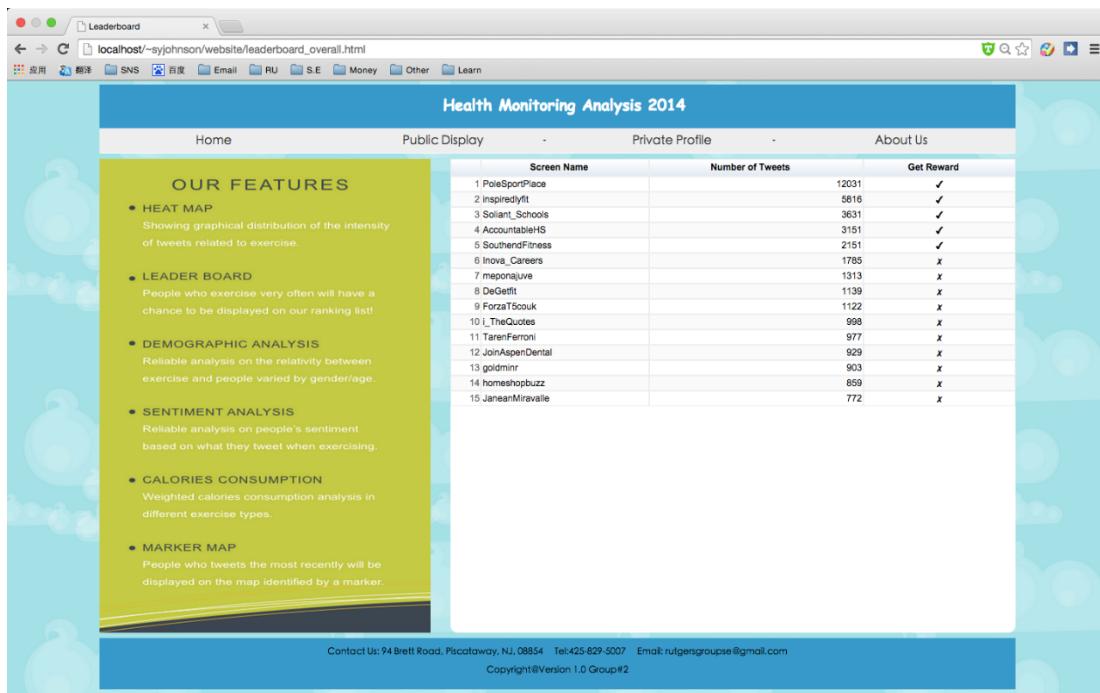
**Figure 1-39: Topic Correlation**

In the Figure 1-39, this interface shows topic correlation between exercise and health, exercise and fruit, health and fruit. For instance, from this figure you may see the amount of tweets about fruit is positive correlated with the amount of tweets about exercise.



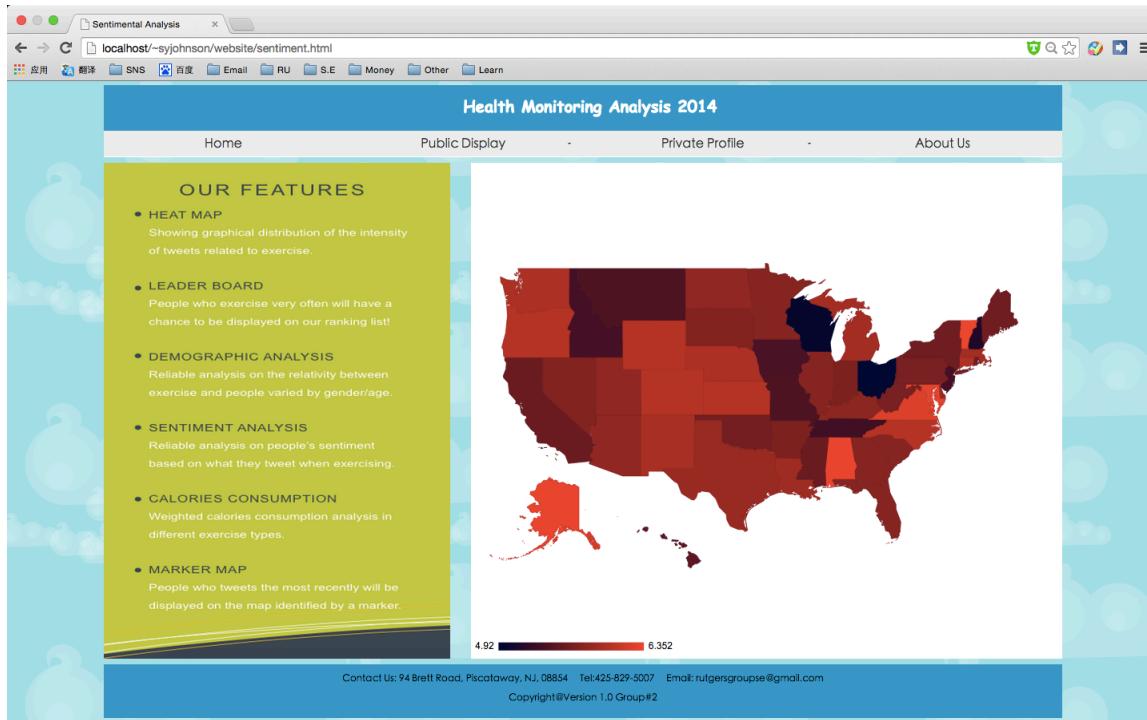
**Figure 1-40: Heat Map**

In the Figure 1-40, when clicking on the Heat Map button, this interface shows the exercise intensity in different areas all over the world. The red spot shows that there are more exercise fans, while the green spot shows there are less exercise fans.



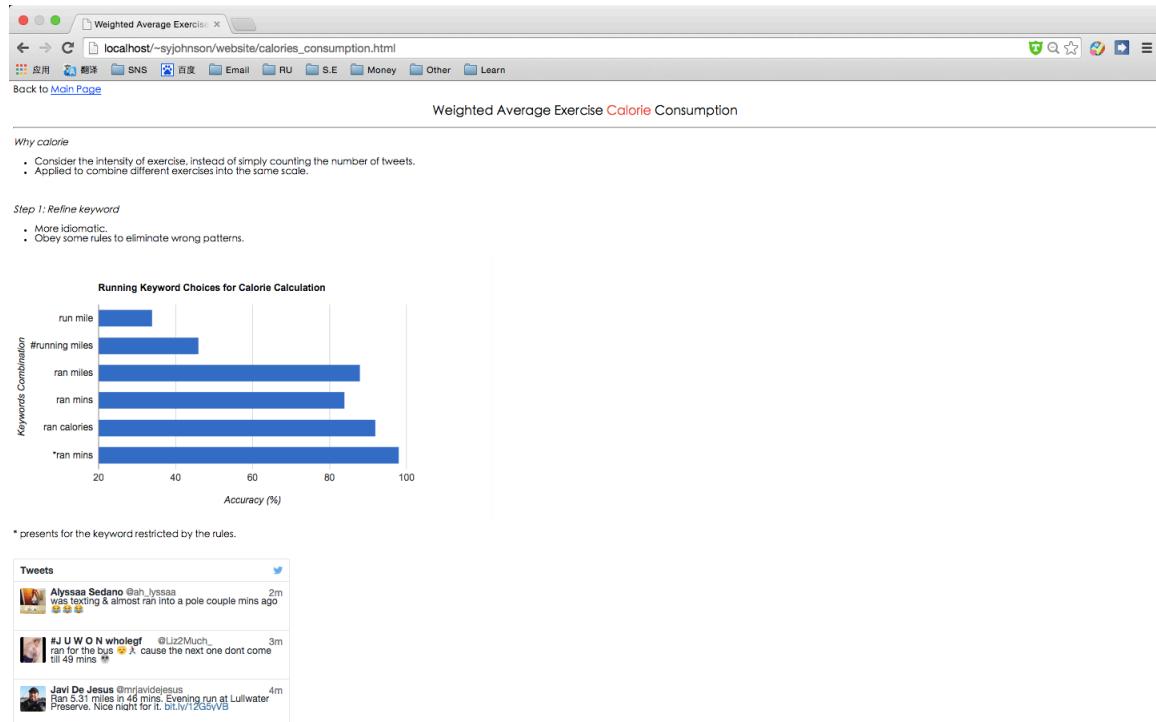
**Figure 1-41: Leaderboard**

In the Figure 1-41, when clicking on the Leader board button, this interface displays the ranking list of the users who exercise the most.



### Figure 1-42: Sentiment Analysis

In the Figure 1-42, when clicking on the Sentiment Analysis button, you can see the mood when people are exercising. The sentiment state map shows that the mood varied by colors. The darker the state is , the mood is happier.



### Figure 1-43: Calories Consumption-part1

Screenshot of a web browser showing a list of tweets from various users discussing their running activities. The tweets include mentions of distances run, times taken, and personal experiences.

Using past tense contributes the idiomacity. As a result, the hashtag is not the best choice. `ran miles`, `ran mins`, and `ran calories` are good candidates. But `miles` can not be applied to other exercises, and `calories` appears in the tweet at low frequency. The accuracy of `ran mins` improved by obeying the rules below:

- In-order
- Short distance
- No comma, dot, apostrophe between
- No word group

The solution is the pattern matching. See details for P.M. in [MySQL](#) and [PHP](#).

**Figure 1-44: Calories Consumption-part2**

Screenshot of a web browser showing a MySQL query for selecting tweets based on exercise type and duration. Below the query is a chart comparing current keywords with previous keywords for different exercise types.

**Comparing Current Keywords with Previous Keywords**

Exercise Types	Current	Previous
Running	running mins	ran mins
Cycling	cycling mins	rode mins
Swimming	swimming mins	swam mins
Basketball	basketball mins	played basketball mins
Football	football mins	played football mins

Step 2: Calculate calorie

- Extract the time of exercise.
- The time extraction accuracy of original keywords is really low. Click to see the [time extraction test file](#).
- The time extraction with refined keywords applied rules above and threshold for different exercises has little error. Click to see the [time extraction test file](#).
- Calculate the weighted average calorie in different exercises.

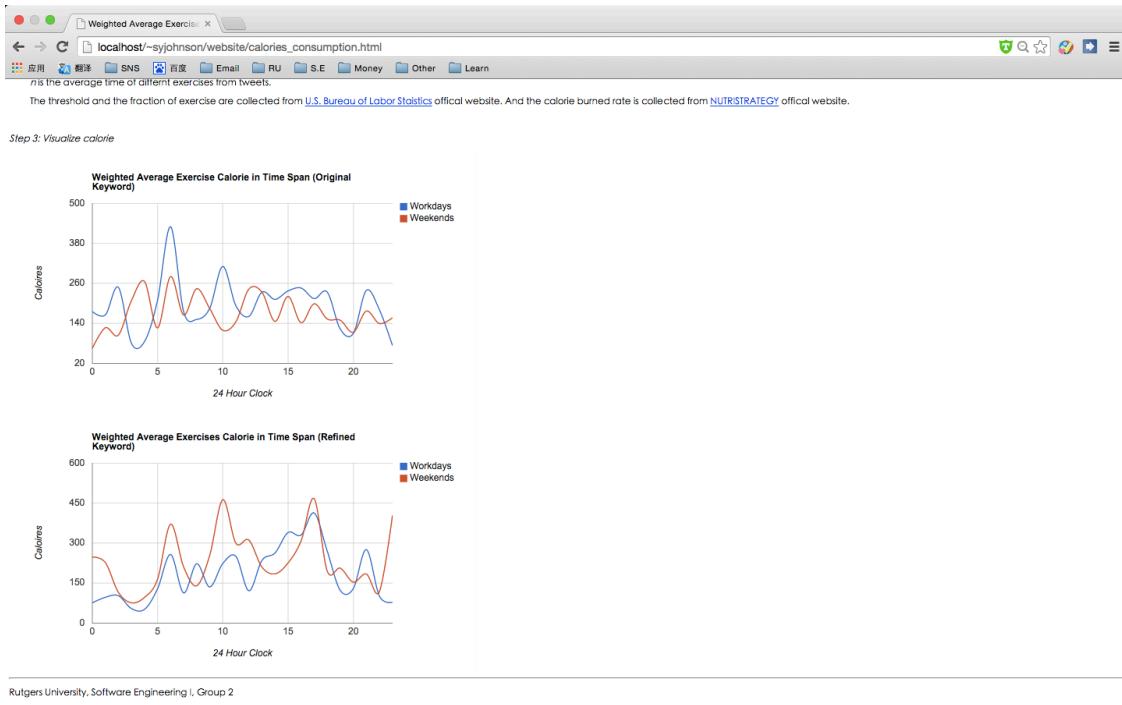
Equation:

$$\text{Calorie} = \frac{\sum_{i=1}^n W_i \cdot C_i \cdot f_i}{\sum_{i=1}^n W_i}$$

$n$  is the number of exercise types.  
 $W_i$  is the fraction of the exercise among all types.  
 $C_i$  is the calorie burned rate per hour of different exercises.  
 $f_i$  is the average time of different exercises from tweets.

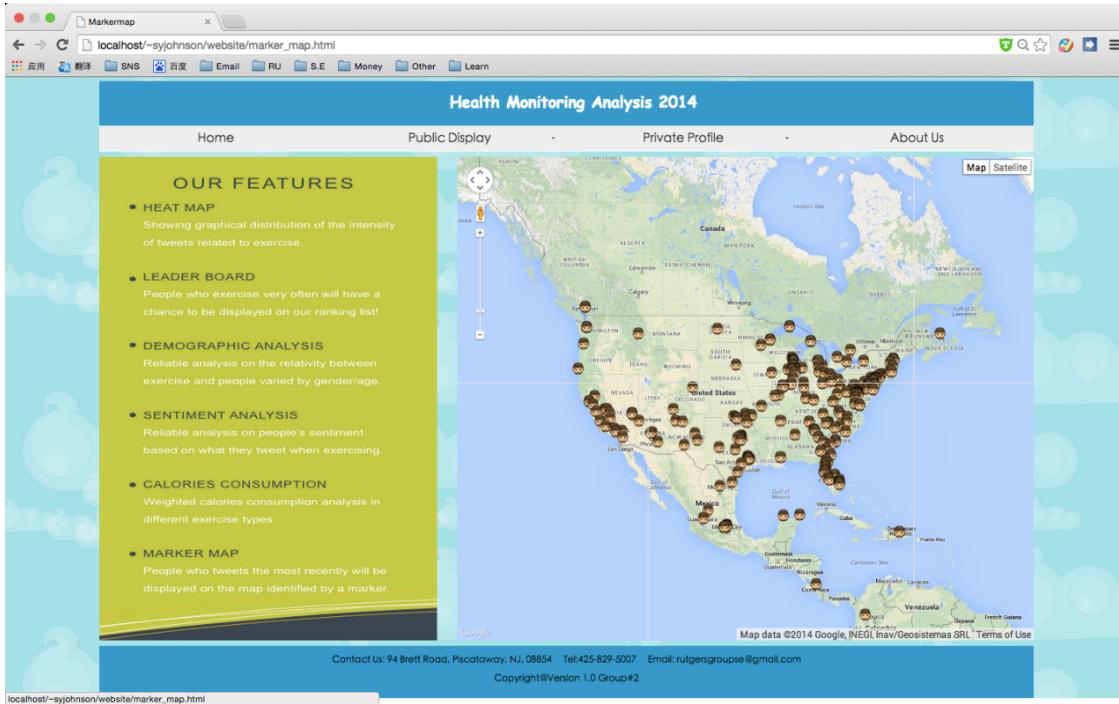
The threshold and the fraction of exercise are collected from [U.S. Bureau of Labor Statistics](#) official website. And the calorie burned rate is collected from [NUTRISTRATEGY](#) official website.

**Figure 1-45: Calories Consumption-part3**



**Figure 1-46: Calories Consumption-part4**

In the Figure 1-43 to 1-46, when clicking on the calories consumption button, you may see the Weight Average Exercise Calories Consumption.



**Figure 1-47: Marker Map**

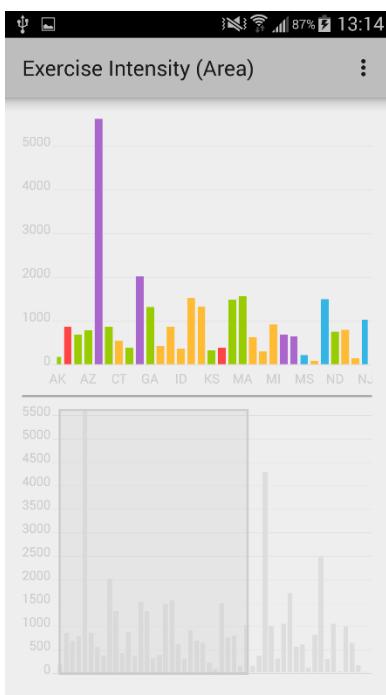
In the Figure 1-47, when clicking on the Marker Map button, you may see markers on the map for users who have tweeted a tweet concerning exercise and mentioned his exercise duration time. Once the marker is clicked, the interface will pop out the duration time and the exercise type on the top of the marker.

### 1.3. Android Application



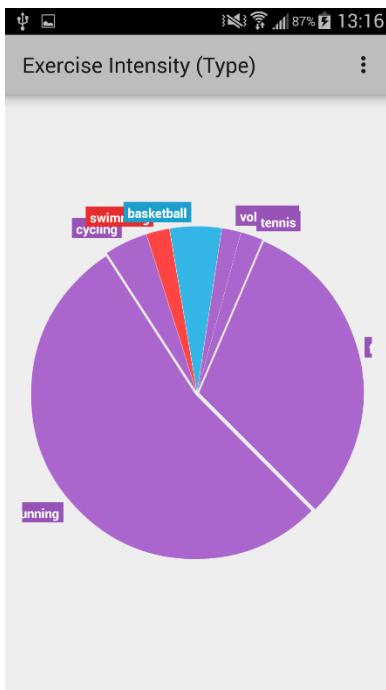
**Figure 1-48. Main menu**

In Figure 1-48, this is the main menu of our Android application, which contains a list view where each cell represents a feature of our project.



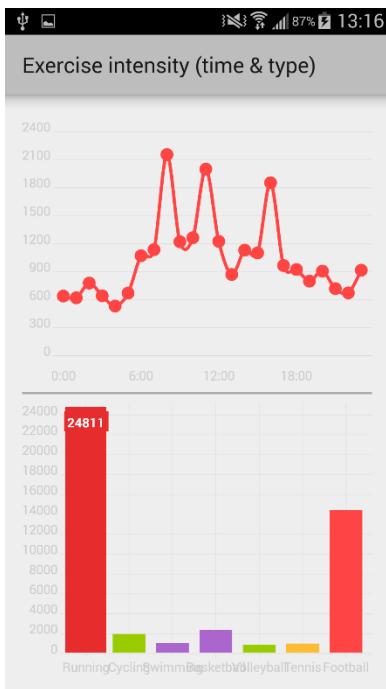
In the Figure 1-49, this interface shows the bar chart of the exercise intensity of all states in the United States. You can zoom in/out to see the detail in each state.

**Figure 1-49. Exercise Intensity (Area)**



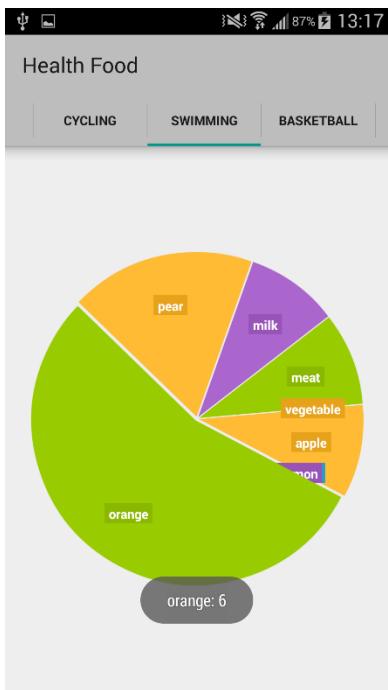
In Figure 1-50, this interface shows the pie chart of the exercise intensity of different **exercise types**.

**Figure 1-50. Exercise Intensity (Type)**



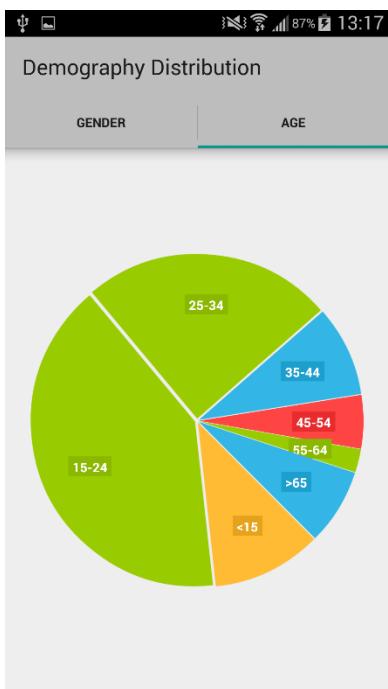
In Figure 1-51, this interface shows a line chart and a bar chart. The bar chart shows the total number of tweets related to each exercise type. By touching on each bar, the line chart will show the intensity tendency of the certain type in the time of day.

**Figure 1-51. Exercise Intensity (time & time)**



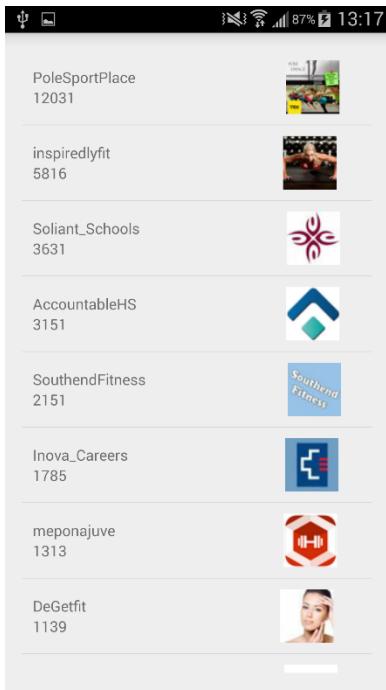
In Figure 1-52, this interface shows the pie charts of food distribution for different exercise types. By swiping the screen, you can change the exercise type.

**Figure 1-52. Health Food**



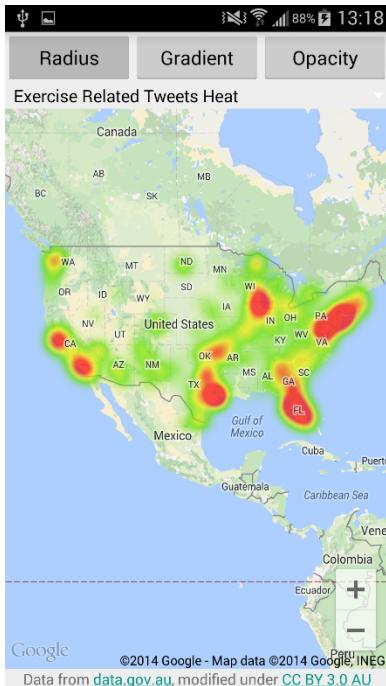
In Figure 1-53, this interface shows the pie charts for age distribution and gender distribution. By swiping the screen, you can change the demography type to see details.

**Figure 1-53. Demography Distribution**



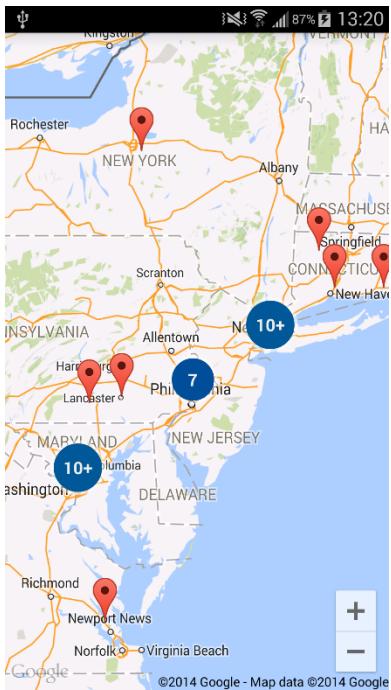
In Figure 1-54, this interface shows the leader board ranking of all twitter users, ranked by the number of exercise-related tweets.

**Figure 1-54. Leader Board**



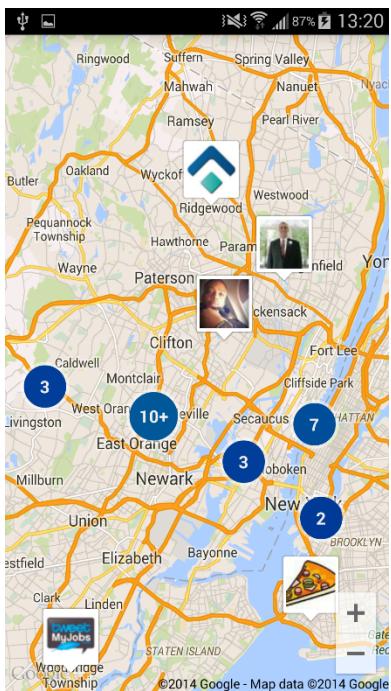
In Figure 1-55, this interface shows the heat map for the exercise-related tweets in the United States. You can also change the radius, gradient, and opacity of the radio point.

**Figure 1-55. Heat Map**



In Figure 1-56, this interface shows the clustering marker map for the exercise-related tweets. When zooming in, the individual markers show on the map. When zooming out, the markers gather together into clusters with certain numbers on the top.

**Figure 1-56. Clustering Marker Map**



In Figure 1-57, this interface shows the marker map for the exercise-related tweets with user profile images. By tapping on each picture, the user's screen name will be shown on the top of the picture.

**Figure 1-57. Picture Marker Map**