

# MAT259 Proj 2: 2D Spatial Map

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## Concept

As a geographer, I am interested in whether I can apply some cartographical design in the 2D spatial maps such as choropleth maps or spatial density maps to visualize the temporal patterns of check-outs in different granularities, such as hourly, daily, weekly and monthly. And more importantly, different visualization methods might have their own pros and cons. I will try different ways to find a good visualization to show the temporal patterns of check-outs. Specifically, a choropleth map is a thematic 2D-map in which areas are shaded or patterned in proportion to the measurement of the statistical variable being displayed on the map. In addition, with regard to the spatial density maps, it calculates the density of features around each output cell (a cell is one or several pixels) based on its value and neighborhoods' values. Conceptually, a neighborhood is defined around each cell center, and the number of cells that fall within the neighborhood is summarized and divided by the area of the neighborhood.

## Data and Query

For the X-axis dimension, it is labeled as hourly; for the Y-axis dimension, we can change into different temporal scales, such as days of a week, days of a month, or days of a year.

### (1) Hourly check-outs “hot-spots” across a week

```
SELECT dayofweek(cout), hour(cout), count(*) /*count the number of transactions by day*/  
FROM inraw /*select the data from the target table inraw*/  
WHERE date(cout)>="2013-10-07" AND date(cout)<="2013-10-13" /*set the time period*/  
GROUP BY dayofweek(cout), hour(cout)
```

ORDER BY dayofweek(cout), hour(cout); /\*group the results by different days, note that 1 represents Sunday, 2 for Monday, and such\*/

**Processing Time:** 27.628 seconds and 89 rows returned

## Results

[http://www.geog.ucsb.edu/~sgao/mat259/2013OctWeekHouly\\_checkouts.csv](http://www.geog.ucsb.edu/~sgao/mat259/2013OctWeekHouly_checkouts.csv)

### (2) Hourly check-outs “hot-spots” across a month

```
SELECT dayofmonth(cout), hour(cout), count(*)
FROM inraw
WHERE date(cout)>="2013-10-01" AND date(cout)<="2013-10-31"
GROUP BY dayofmonth(cout), hour(cout)
ORDER BY dayofmonth(cout), hour(cout);
```

**Processing Time:** 27.799 seconds and 373 rows returned

## Results

[http://www.geog.ucsb.edu/~sgao/mat259/2013OctMonthHouly\\_checkouts.csv](http://www.geog.ucsb.edu/~sgao/mat259/2013OctMonthHouly_checkouts.csv)

### (3) Hourly check-outs “hot-spots” across a year

```
SELECT dayofyear(cout), hour(cout), count(*)
FROM inraw
WHERE date(cout)>="2013-01-01" AND date(cout)<="2013-12-31"
GROUP BY dayofyear(cout), hour(cout)
ORDER BY dayofyear(cout), hour(cout);
```

**Processing Time:** 30.53 seconds and 4319 rows returned

## Results

[http://www.geog.ucsb.edu/~sgao/mat259/2013YearHouly\\_checkouts.csv](http://www.geog.ucsb.edu/~sgao/mat259/2013YearHouly_checkouts.csv)

Doodle:

