direction_googlemaps

April 25, 2017

```python
In [1]: import googlemaps
        import pandas as pd
        import numpy as np
```

```python
In [2]: gmaps = googlemaps.Client(key = 'AIzaSyAXSxOd6vkVEYzmt_EAoR_H6XnqioeY9Ok')
        gcode = googlemaps.Client(key = 'AIzaSyD2nDCH07GkK-aM1zTowtMaYhuLvOcJOFo')
```

```python
In [3]: addrs = [ '1313 pagewynne drive, plano tx',
                  'ut dallas',
                  '2400 Preston Rd #200, Plano, TX 75093',
                  '6121 W Park Blvd, Plano, TX 75093',
                  '2300 Coit Rd, Plano, TX 75075',
                  '3800 N Central Expy, Plano, TX 75074',
                  '4757 W Park Blvd #108, Plano, TX 75093',
                  '2109 W Parker Rd #210, Plano, TX 75023',
                  '5901 Coit Rd, Plano, TX 75093',
                  '710 W Renner Rd #220, Richardson, TX 75080']
        nn = len(addrs)
```

```python
In [4]: location = np.empty([nn,2])
        for ii in np.arange(nn):
            geocode_dict = gcode.geocode(addrs[ii])
            location[ii,0],location[ii,1] = geocode_dict[0]['geometry']['location']['lat'],geo
```

```python
In [5]: print(location)
```

```
[[ 33.0174543 -96.7783156]
 [ 32.9857619 -96.7500993]
 [ 33.0294639 -96.7927873]
 [ 33.0304543 -96.8317351]
 [ 33.0300606 -96.768711 ]
 [ 33.0448381 -96.6989842]
 [ 33.027786  -96.790364 ]
 [ 33.0419151 -96.7343238]
 [ 33.054627  -96.7710167]
 [ 32.9980093 -96.7295968]]
```

```python
In [6]: my_distance = gmaps.distance_matrix(addrs,addrs)
```

```
In [7]: distance_matrix = np.empty([nn,nn])
        duration_matrix = np.empty([nn,nn])

In [8]: for ii in np.arange(nn):
            for jj in np.arange(nn):
                distance_matrix[ii,jj] = my_distance['rows'][ii]['elements'][jj]['distance']['v
                duration_matrix[ii,jj] = my_distance['rows'][ii]['elements'][jj]['duration']['v

In [9]: df_distance = pd.DataFrame(distance_matrix,index = addrs,columns = addrs)

In [10]: df_duration = pd.DataFrame(duration_matrix,index = addrs,columns = addrs)

In [11]: df_location = pd.DataFrame(location,index = addrs,columns = ['latitude', 'longitude'])

In [12]: df_location

Out[12]:                                              latitude  longitude
         1313 pagewynne drive, plano tx              33.017454 -96.778316
         ut dallas                                   32.985762 -96.750099
         2400 Preston Rd #200, Plano, TX 75093       33.029464 -96.792787
         6121 W Park Blvd, Plano, TX 75093           33.030454 -96.831735
         2300 Coit Rd, Plano, TX 75075               33.030061 -96.768711
         3800 N Central Expy, Plano, TX 75074        33.044838 -96.698984
         4757 W Park Blvd #108, Plano, TX 75093      33.027786 -96.790364
         2109 W Parker Rd #210, Plano, TX 75023      33.041915 -96.734324
         5901 Coit Rd, Plano, TX 75093               33.054627 -96.771017
         710 W Renner Rd #220, Richardson, TX 75080  32.998009 -96.729597

In [13]: df_distance.to_csv('distance.csv')
         df_duration.to_csv('duration.csv')
         df_location.to_csv('location.csv')
```

2