403 Project

April 14, 2021

[2]:

```
!pip install cjklib3
```

```
Requirement already satisfied: cjklib3 in /opt/conda/lib/python3.8/site-packages
(0.0.3)
Requirement already satisfied: SQLAlchemy<2.0,>=0.9.4 in
/opt/conda/lib/python3.8/site-packages (from cjklib3) (1.3.20)
```

[3]:

```
#import sys
#!{sys.executable} -m pip install cjklib
import numpy as np
import pandas as pd
import cjklib
from cjklib import characterlookup
```

[4]:

```
df = pd.read_csv('Chinese Lexicon Project Sze et al.csv')
```

[5]:

```
# df
```

[6]:

```
# Import the xinhua Chinese dictionary
xinhua = pd.read_csv("xinhua.csv")
```

[7]:

```
char = list(df.Character)
rt = list(df.RT)
xinhua_char = list(xinhua.character)
radical = list(xinhua.radical)
```

[8]:

```
######################## Study 1 ########################

# check stroke counts
charlookup = characterlookup.CharacterLookup('T')
stroke_count = []
for i in char:
    stroke_count.append(charlookup.getStrokeCount(i))

# Uncomment to check the stroke count
#stroke_count
```

[9]:

```
######################## Study 2 #######################
# get the radical for each character
new_char = []
radical_list = []
for i in range(len(char)):
    for j in range (len(xinhua_char)):
        if char[i] == xinhua_char[j]:
            radical_list.append(radical[j])
            new_char.append(char[i])

# print(radical_list)
# print(new_char)
```

[10]:

```
# get the stroke count for each charcter in the new list
new_stroke_count = []
for i in new_char:
    new_stroke_count.append(charlookup.getStrokeCount(i))

# get the radical count for each charcter
radical_count = []
for j in radical_list:
    radical_count.append(charlookup.getStrokeCount(j))

#print(radical_count)
```

[11]:

```
# check radical removed stroke counts
radical_removed = []
for i in range(len(new_stroke_count)):
    x = new_stroke_count[i] - radical_count[i]
    radical_removed.append(x)

#print(radical_removed)
```

[12]:

```
# get the reaction time list for radical removed characters
new_rt = []
for i in range(len(char)):
    for j in range(len(new_char)):
        if char[i] == new_char[j]:
            new_rt.append(rt[i])

# new_rt
```

[13]:

```
######################## Data Analysis #######################

import matplotlib.pyplot as plt
from scipy import stats
```

[15]:

```
# Study 1 linear regression results
slope1, intercept1 =  np.polyfit(stroke_count, rt, 1)
result_1 = stats.linregress(stroke_count, rt)
print(result_1)
```

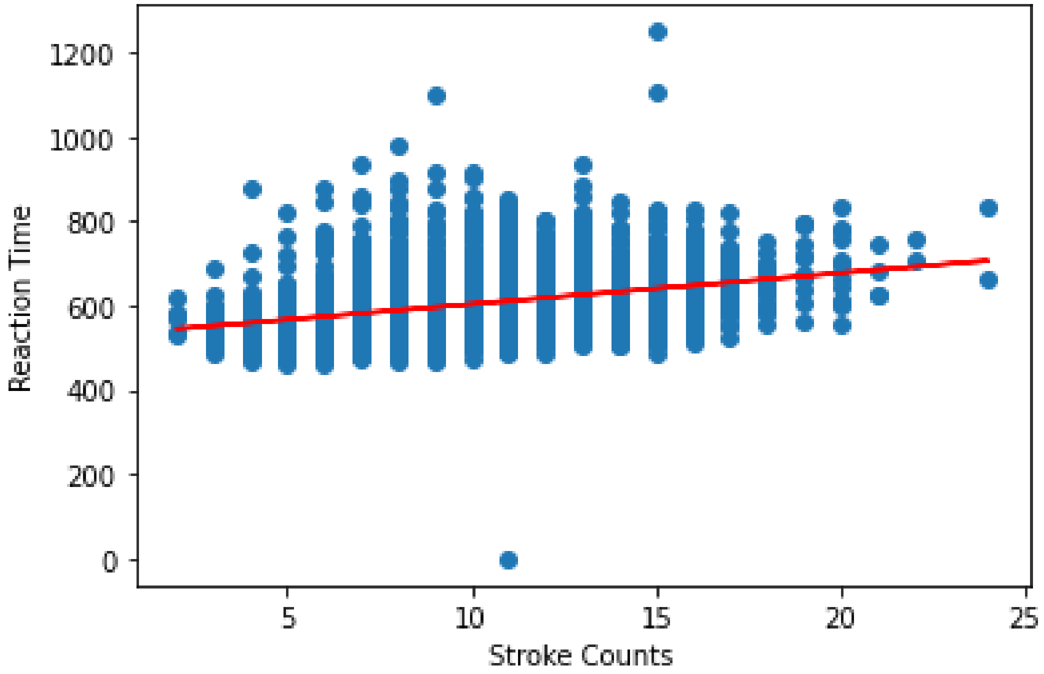
```
LinregressResult(slope=7.369933790047458, intercept=529.7896487616249,
rvalue=0.3098711047884425, pvalue=8.96616586439971e-57,
stderr=0.4524448772607573)
```

[16]:

```
# Study 1 result graph
plt.scatter(stroke_count, rt)
plt.plot(stroke_count, np.multiply(slope1, stroke_count) + intercept1, 'r-')
plt.xlabel("Stroke Counts")
plt.ylabel("Reaction Time")
```

[16]:

```
Text(0, 0.5, 'Reaction Time')
```



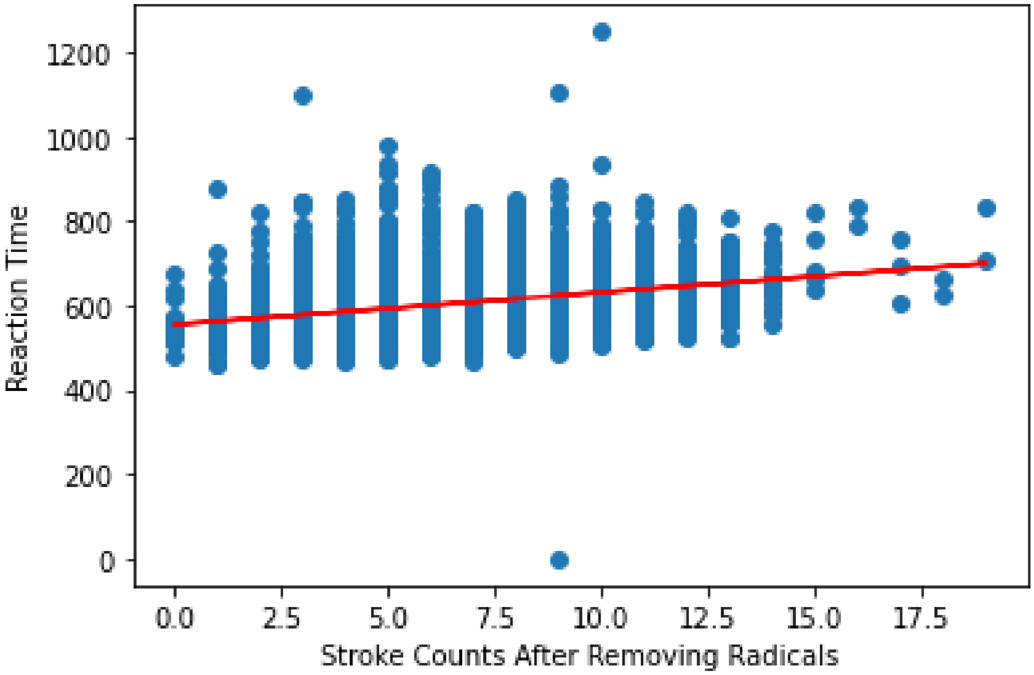
[17]:

```
# Study 2 linear regression results
slope2, intercept2 = np.polyfit(radical_removed, new_rt, 1)
result_2 = stats.linregress(radical_removed, new_rt)
print(result_2)
```

```
LinregressResult(slope=7.619099272309819, intercept=555.0624164800901,
rvalue=0.2790367734354089, pvalue=7.186914042240392e-46,
stderr=0.5250395735895467)
```

```
[18]: # Study 2 result graph
      plt.scatter(radical_removed, new_rt)
      plt.plot(radical_removed, np.multiply(slope2, radical_removed) + intercept2,␣
       ↪'r-')
      plt.xlabel("Stroke Counts After Removing Radicals")
      plt.ylabel("Reaction Time")
```

```
[18]: Text(0, 0.5, 'Reaction Time')
```



```
[19]: # correlation analysis
      from scipy.stats import pearsonr
      stroke_cor = pearsonr(stroke_count, rt)
      radical_cor = pearsonr(radical_removed, new_rt)

      # study 1 correlation
      print("Correlation for study 1 is: ", stroke_cor)

      # study 2 correlation
      print("Correlation for study 2 is: ", radical_cor)
```

```
Correlation for study 1 is:  (0.3098711047884415, 8.966165864431881e-57)
Correlation for study 2 is:  (0.2790367734354088, 7.186914042211598e-46)
```

[20]:

```
# Check characters with more than 20 strokes
for i in char:
    if charlookup.getStrokeCount(i) >20:
        print(i)
```

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