PET MEDICAL SERVICE IN TAIWAN?

...

Presentation: May 16th, 2021
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OUTLINE

MOTIVATION

Return

Why do I Focus on the Scope of "PETS"?

3 REASONS AROUSE MY CURIOSITY FOR THIS POTENTIAL ISSUE.

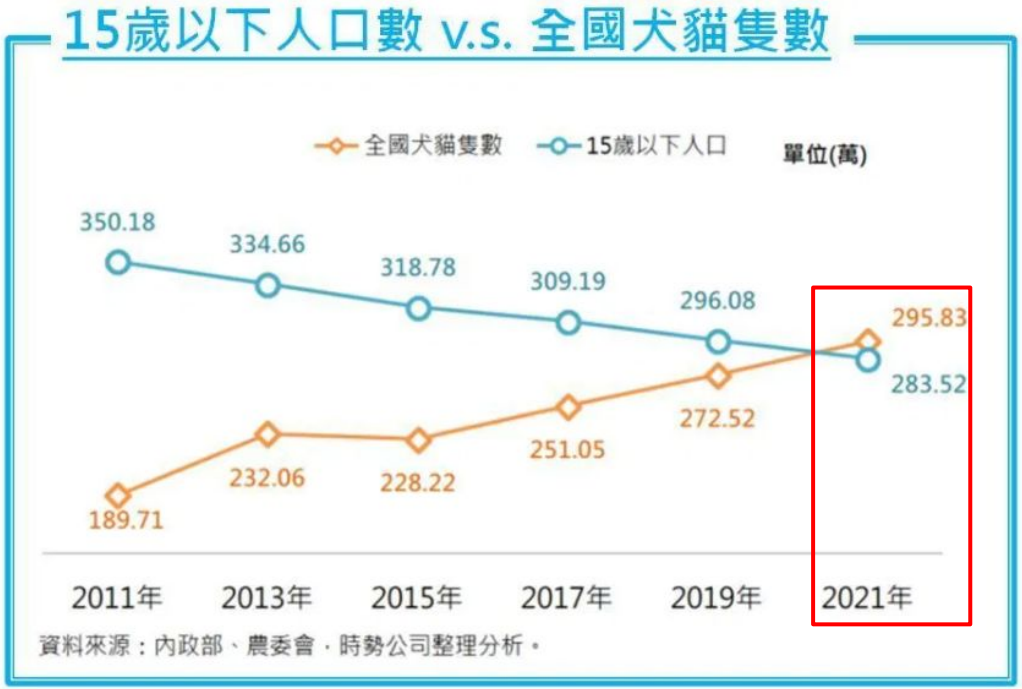
1. I 'm a pet lover. I have raised 3 cats, but 2 of them passed away due to illness.
2. I work at pet technology company around 2 years.
3. One news I read a few years ago mentioned that Taiwan will become the next Japan, they predicts that the number of pets will exceed the number of people under 15 in 2021.

->(refer to attached image on the right hand)

日本早在2003年犬貓數就超過15歲以下的孩童人口，時勢研究追蹤推測，台灣將步日本後塵，預估於2020下半年出現黃金交叉，全台犬貓隻數將首度超過15歲以下孩童數，寵物經濟時勢所趨。

依2011至2017年的犬貓數及孩童人口平均年增減率進行推估，時勢研究預測2020年下半年全台犬貓數將首度超過15歲以下孩童數，於2021年達295萬隻，首次超過283萬名孩童。

根據內政部所公布的人口資料，國內15歲以下的孩童數在少子化浪潮下，每年以4%的急速下降；反之，農委會報告的全國犬貓隻數，卻逐年上升至2017年的251萬隻，比起兩年前成長10%。反映21世紀社會經濟發展的過程中，人口結構性變化與經濟壓力兩大因素推波助瀾。



Assuming the previous prediction is **true**, then the **upcoming problems** may be...

Problem 1

In Taiwan, do we have enough Veterinary Medical Institutions?

Problem 2

In Taiwan, is there a big gap between the service quality and professionalism of each Veterinary Medical Institution by different counties and cities?

Problem 3

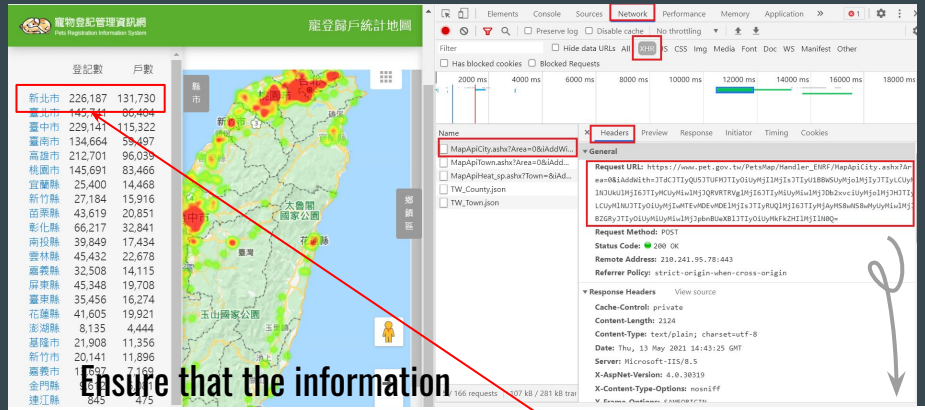
skip

Does every breeder have the concept of animal sterilization?

DATA COLLECTION and CLEANING

Return

Raw data for “寵物登記數量”



- Data period: 2011/1/1-2021/5/3
- Format: Json / Array
- Size : 22

petrig	list	22	[{'CountyOrder':0, 'CountyID':'A', 'CountyName':'新北市', 'HouseCnt':1317 ...

Find a way to get raw data with json file.

Ensure that the information which is the data I need.

Raw data for “獸醫師(佐)開業執照”

- Latest updated: Feb. 2021
- Format: Json / Array
- Size : 1923

Name	Type	Size	Value
jsonraw	list	1923	[{'縣市':'新北市', '字號':'新北獸醫業字第409號', '執照類別':'獸醫師', '狀態':'開業', '機構名稱':'愛竹動 ...

- The key & value we need:

1. “縣市”
2. “狀態” is “開業”
3. “機構名稱”
4. “發照日期”
5. “機構地址”


```
[
  {
    "縣市": "新北市",
    "字號": "新北獸醫業字第409號",
    "執照類別": "獸醫師",
    "狀態": "開業",
    "機構名稱": "愛竹動物醫院",
    "負責獸醫": "陳欣妍",
    "機構電話": "(02)29880822",
    "發照日期": "20210209",
    "機構地址": "新北市五股區四維路102號"
  },
  {
    "縣市": "臺中市",
    "字號": "中市獸醫開字第110003號",
    "執照類別": "獸醫師",
    "狀態": "開業",
    "機構名稱": "毛博事保健動物醫院",
    "負責獸醫": "周哲緯",
    "機構電話": "(04)23138329",
    "發照日期": "20210208",
    "機構地址": "臺中市西屯區文心路三段138之10號"
  },
  {
    "縣市": "新北市",
    "字號": "新北獸醫業字第408號",
    "執照類別": "獸醫師",
    "狀態": "開業",
    "機構名稱": "貝果動物醫院",
    "負責獸醫": "吳佳倩",
    "機構電話": "(02)31511107",
    "發照日期": "20210202",
    "機構地址": "新北市中和區安樂路75號"
```

Raw data for the Google Review Score of each Veterinary Medical Institution

Tag name & Class name we need to get the review score of this Veterinary Medical Institution

```
        <span class="OmTIzf"></span>
        <span class="OmTIzf"></span>
        <span class="OmTIzf"></span>
中信動物醫院  <span><h3 class="zBAuLc"><div class="BNeawe deIvCb AP7Wnd">中信動物醫院</div></h3></span>
 4.6  (398)
位於新北市的動物醫院      <span><div class="BNeawe tAd8D AP7Wnd"><span class="r0bn4c rQMQod tP9Zud">
<span aria-hidden="true" class="Eq0J8 oqSTJd">4.6</span> <div aria-label="評等為 4.6，最高 5"
class="Hk2yDb KsR1A" role="img"><span style="width:63px"></span></div> <span class="Eq0J8">(398)</span>
</span>
位於新北市的動物醫院</div></span>
 4.6  (398)     <span class="r0bn4c rQMQod tP9Zud"> <span aria-hidden="true" class="Eq0J8 oqSTJd">4.6</
span> <div aria-label="評等為 4.6，最高 5"
span></div> <span class="Eq0J8">(398)</sp
4.6     <span aria-hidden="true" class="E
        <span style="width:63px"></span>
(398)   <span class="Eq0J8">(398)</span>
地址      <span><span class="BNeawe s3v9r
地址      <span class="BNeawe s3v9rd AP7W
220新北市板橋區信義路188號        <span><sp
span></span>
220新北市板橋區信義路188號        <span cla
```

Google Review Score

```python
def rqResponse(url,linktype='wb'):
    ResponObj=rq.get(url)
    ResponObj.encoding =ResponObj.apparent_encoding
    if (ResponObj.status_code == 200) &(linktype=='wb'):
        return ResponObj.text
    elif (ResponObj.status_code == 200) &(linktype=='json'):
        return ResponObj.json()
    else:
        return "error"+str(ResponObj.status_code)

def GoogleReviewScore(search_key,tagname,classname):
    url='https://www.google.com/search?q='+search_key+'&authuser=1&sxsrf=ALeKk03cgwLYEBNl8oVOkOP7VGVt
    rs= rqResponse(url,linktype='wb')
    bsObj= BeautifulSoup(rs,'lxml')
    listbsObj=bsObj.find_all(tagname,{"class":classname})
    if len(listbsObj) >=1:
        return listbsObj[0].text
    else:
        return "No Result"
```

DATA ANALYSIS and VISUALIZATION

Return

Major Packages

Requests

Pandas

Folium

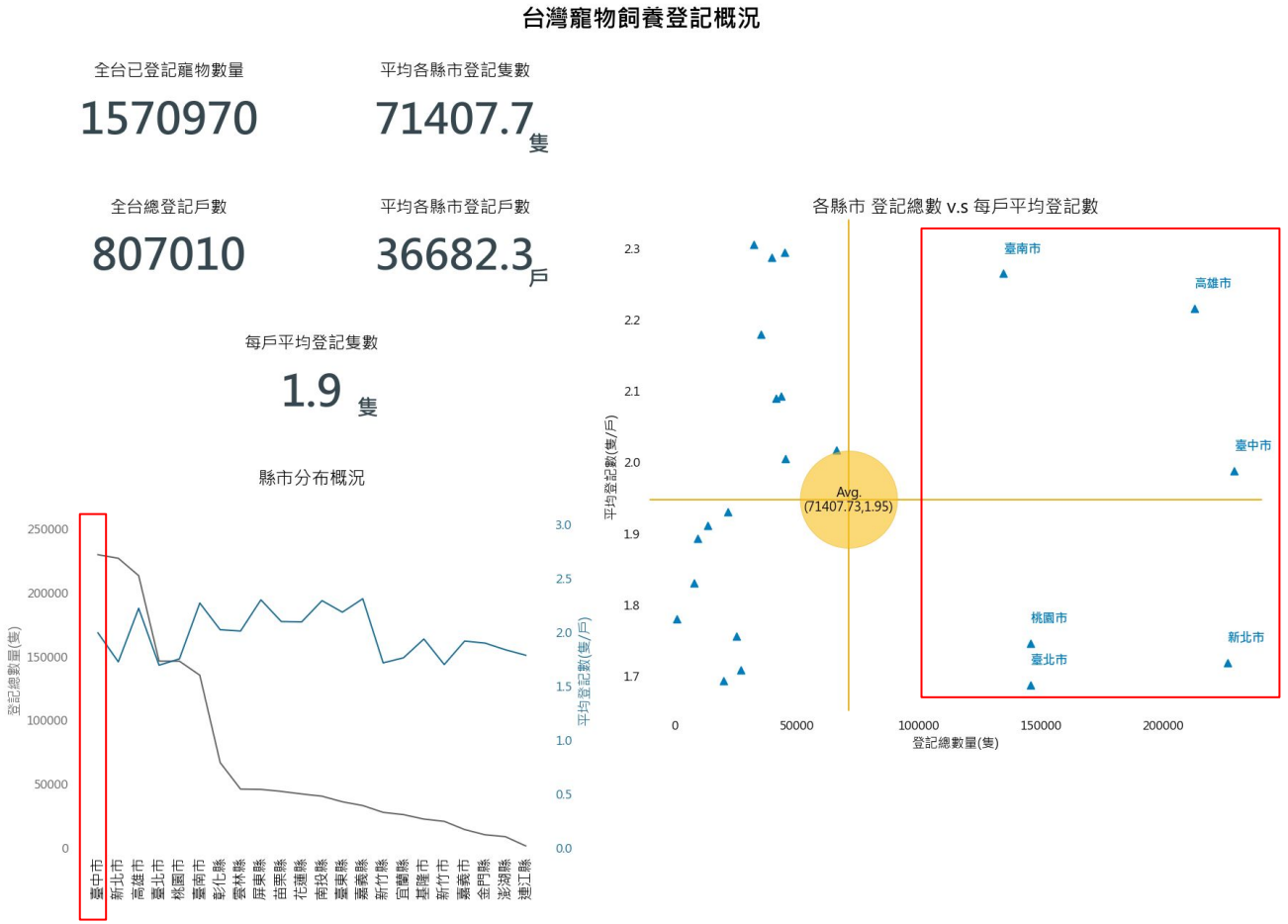
Matplotlib.pyplot

- 全台目前已登記的犬貓數量超過157萬
- 每個家庭平均飼養超過1隻
- 登記最多數量縣市為台中市
- 登記總數超過平均的縣市集中在六都
  - 六都內北部縣市每戶平均登記數低於平均
  - 六都內中南部縣市每戶平均登記數高於平均

基於上述,可得出以下推論

I. 登記總數和人口分布 (或經濟條件)有一定程度關係

II. 每戶平均登記飼養數與居住環境型態有一定程度關係



- 全台合法登記獸醫院所共**1910**間
- 平均各縣市有**91**間獸醫院所
- **最多**合法獸醫院所數量的為**台中市**
- 平均每間獸醫院所需要負載的犬貓數量為822.5隻

→ 延伸問題: 一間獸醫診所實際能負載數量是多少呢?

基於上述,將台灣獸醫醫療資源依縣市做以下分級

I. 嚴重不足:(紅)

連江縣
金門縣
澎湖縣
台東縣

II. 部分不足: (橘)

III. 待觀察: (黃)

桃園市
高雄市
新北市
台中市

台灣獸醫院所資源概況說明

合法獸醫醫療診所總數

1910

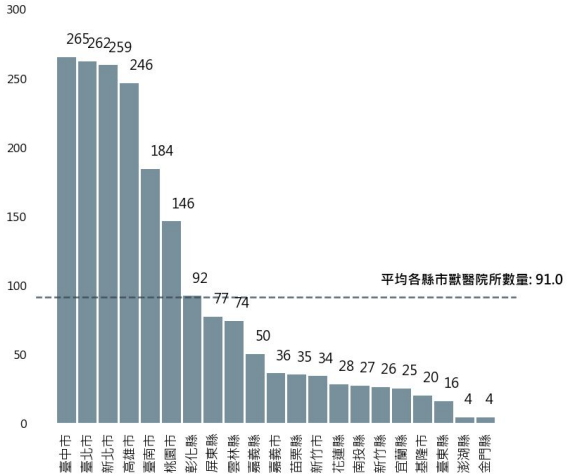
平均各縣市獸醫院所數量

91.0 間

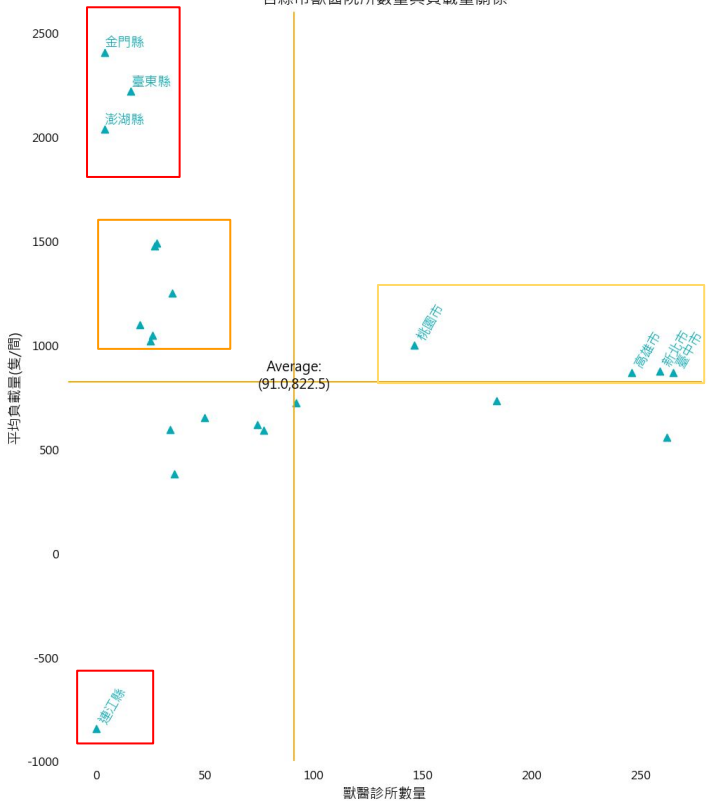
獸醫院所平均負載量

822.5 隻

縣市分布概況



各縣市獸醫院所數量與負載量關係



In Taiwan, do we have enough Veterinary Medical Institutions?

Unsure, Need more data to validate.

- 被評價獸醫院所 **共1381間**
- 評價分數 **平均4.29分**

→ 延伸問題: 並非每間獸醫院所都有獲得評價,且每間獸醫獸醫院所獲得評價個數不一,會導至分析結果與實際有一定誤差存在

基於上述,就目前結果將台灣獸醫院所服務評價做以下分級

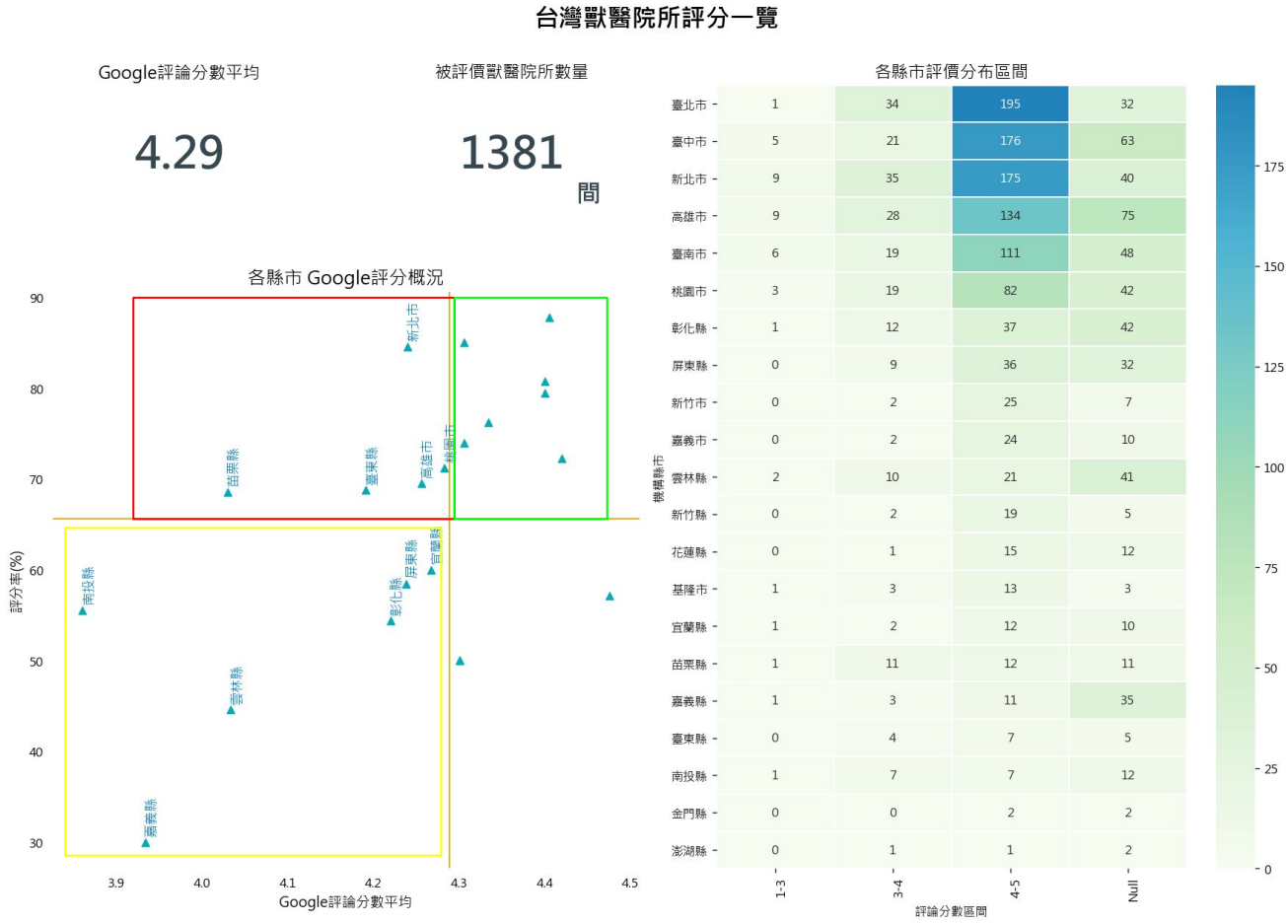
I. 需有立即檢視與改善 :(紅)

新北市
桃園市
高雄市
台東縣
苗栗縣

II. 需進一步調查: (黃)

宜蘭縣
屏東縣
彰化縣
南投縣
雲林縣
嘉義縣

III. 繼續保持: (綠)



In Taiwan, is there a big gap between the service quality and professionalism of each Veterinary Medical Institution by different counties and cities?

Unsure, Need more data to validate.

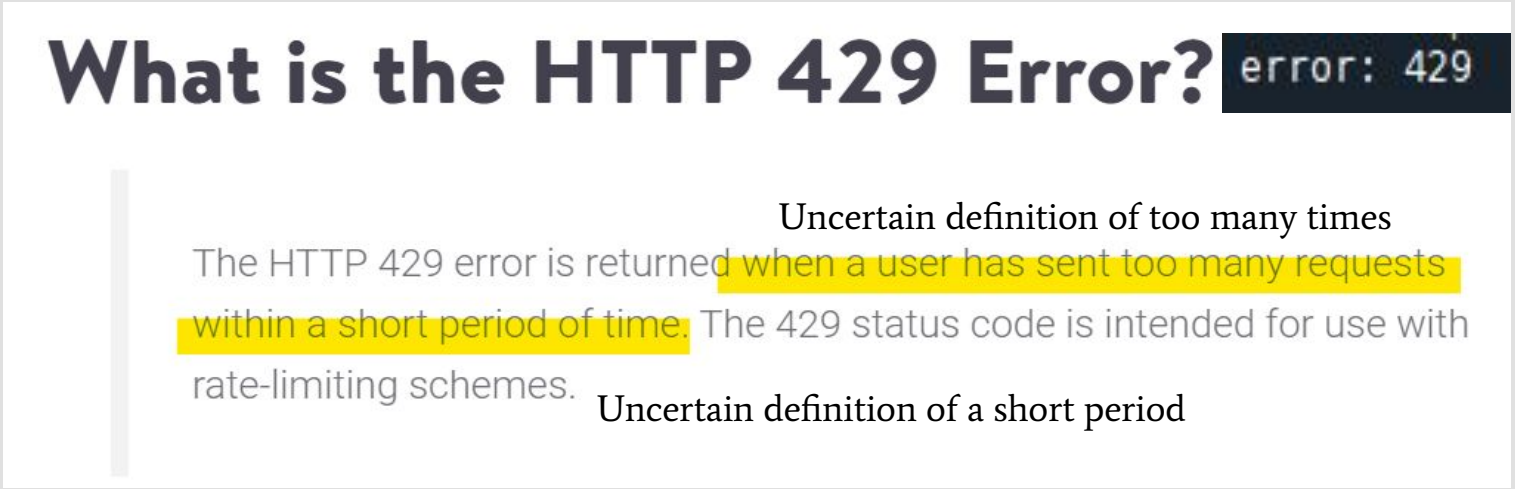
Area Scatter Map

View it

CHALLENGE and LEARNING

Return

Challenge 1 Raise an http error : 429



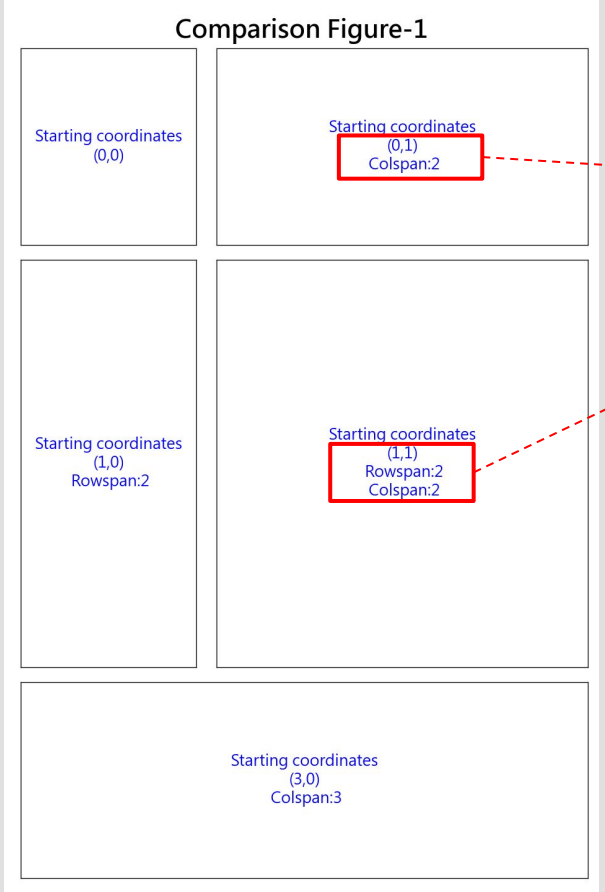
Workaround:

>> Execute the code in next day.

>> Save into csv in batches(every 200 requests) to prevent sudden http errors happening again.

```
#Goolge Review
for i in range(0,1910):
    print(pd_VMI.iloc[i,4])
    pd_VMI.iloc[i,7]=GoogleReviewScore(pd_VMI.iloc[i,4],'span','Aq14fc')
    if i%200==0:
        pd_VMI.to_csv('pd_VMI.csv',index=False)
    time.sleep(0.08)
pd_VMI.to_csv('pd_VMI.csv',index=False)
```

Learning 1　How to adjust subplots layout in one figure




```
'''Create Figure-2 Comparison'''
fig=plt.figure(figsize=(8,12),dpi=120)
#set font
plt.rcParams['font.sans-serif'] = ['Microsoft JhengHei']
#subplot layout (row=4, col=3)
#rowspan=1 colspan=1 : default
ax0= plt.subplot2grid((4,3),(0,0))
ax0.text(0.5,0.5,'Starting coordinates\n(0,0)',
         fontsize=15,c='blue',ha='center',va='center')
ax1= plt.subplot2grid((4,3),(0,1),colspan=2)
ax1.text(0.5,0.5,'Starting coordinates\n(0,1)\n Colspan:2',
         fontsize=15,c='blue',ha='center',va='center')
ax2= plt.subplot2grid((4,3),(1,0),rowspan=2)
ax2.text(0.5,0.5,'Starting coordinates\n(1,0)\n Rowspan:2',
         fontsize=15,c='blue',ha='center',va='center')
ax3= plt.subplot2grid((4,3),(1,1),rowspan=2,colspan=2)
ax3.text(0.5,0.5,'Starting coordinates\n(1,1)\n Rowspan:2\n Colspan:2',
         fontsize=15,c='blue',ha='center',va='center')
ax4= plt.subplot2grid((4,3),(3,0),colspan=3)
ax4.text(0.5,0.5,'Starting coordinates\n(3,0)\n Colspan:3',
         fontsize=15,c='blue',ha='center',va='center')
subplot_list1=[ax0,ax1,ax2,ax3,ax4]
for sl in subplot_list1:
    sl.set_xticks([]) # 不要顯示x軸刻度
    sl.set_yticks([]) # 不要顯示y軸刻度
fig.suptitle('Comparison Figure-1',
             fontsize=24,fontweight='bold') #整張圖的title
fig.tight_layout()
plt.savefig('subplot_2.png')
plt.show()
```

Learning 2　How to plot a Map

Collect latitude and longitude data　1　Import "Folium" to draw a interactive map.　2　Need to save into html, and use browser to view it.　3

```
#畫台灣地圖前置作業
Latilongi=[]
bsObj=BeautifulSoup(rqResponse(taiwancity,linktype='wb'),'LxmL')
data= bsObj.find_all('tr')
for i in range(len(data)):
    new=data[i].text.split('\n')
    Latilongi.append([new[2],new[5],new[8]])
```

Inde	Type	Size	
0	list	3	['新北市', '121.6739', '24.91571']
1	list	3	['高雄市', '120.666', '23.01087']
2	list	3	['臺中市', '120.9417', '24.23321']
3	list	3	['臺北市', '121.5598', '25.09108']
4	list	3	['桃園縣', '121.2168', '24.93759']
5	list	3	['臺南市', '120.2513', '23.1417']
6	list	3	['彰化縣', '120.4818', '23.99297']
7	list	3	['屏東縣', '120.62', '22.54951']
8	list	3	['雲林縣', '120.3897', '23.75585']
9	list	3	['苗栗縣', '120.9417', '24.48927']
10	list	3	['嘉義縣', '120.574', '23.45889']
11	list	3	['新竹縣', '121.1252', '24.70328']
12	list	3	['南投縣', '120.9876', '23.83876']
13	list	3	['宜蘭縣', '121.7195', '24.69295']
14	list	3	['新竹市', '120.9647', '24.80395']
15	list	3	['基隆市', '121.7081', '25.10898']
16	list	3	['花蓮縣', '121.3542', '23.7569']
17	list	3	['嘉義市', '120.4473', '23.47545']
18	list	3	['臺東縣', '120.9876', '22.98461']

```
# define the national map
national_map = folium.Map(location=[23.9005,120.5995],tiles='cartodbpositron',
                          zoom_start=7,width='100%',height='100%')
colors=['red','yellow','lime','silver']
for lat, lng, label, city, rc, rr in zip(pd_vetclinccity['緯度'].values,
                                         pd_vetclinccity['經度'].values, pd_vetclinccity['機構名稱'].values,
                                         pd_vetclinccity['機構縣市'].values,pd_vetclinccity['平均評分'].values,
                                         pd_vetclinccity['評分率'].values):
    html = '<h3>'+city+'</h3><br>合法獸醫院所: %.0f間<br>評論分數平均: %.1f分<br>評分率:%.1f%%'%(label,rc,rr)
    iframe = folium.IFrame(html)
    popup = folium.Popup(iframe,
                         min_width=240,max_width=240)
    if label!=0.0:
        radius=math.log(label,4)*5
        if (rc>=avggr)and(rr>=avggrrate):
            folium.CircleMarker(location=[lat, lng],radius=radius,
                                fill=True,fill_opacity=0.7,
                                color=colors[2],opacity=0.9,
                                fill_color=colors[2],
                                popup=popup,
                                #popup="%s\n合法獸醫院所: %d 間"%(city,label),
                                ).add_to(national_map)
        elif (rc>=avggr)and(rr<avggrrate):
            folium.CircleMarker(location=[lat, lng],radius=radius,
                                fill=True,fill_opacity=0.7,
                                color=colors[3],opacity=0.9,
                                fill_color=colors[3],
                                popup=popup,
                                #popup="%s\n合法獸醫院所: %d 間"%(city,label),
                                ).add_to(national_map)
        elif (rc<avggr)and(rr<avggrrate):
            folium.CircleMarker(location=[lat, lng],radius=radius,
```

```
national_map.save('map_pet_medical_service.html')
```

REFERENCE

Return

Source:

- ## Image:
  https://reurl.cc/9ZLpMv
  https://reurl.cc/pm4Znl
  https://reurl.cc/o94Zdv
  https://reurl.cc/a58aN7
  https://reurl.cc/e97W9j
- ## News:
  https://reurl.cc/9ZLpMv
- ## Open Data:
  https://data.gov.tw/dataset/8705
  https://www.pet.gov.tw/PetsMap/PetsMap.aspx
  https://byronhu.wordpress.com/2013/09/09/%E5%8F%B0%E7%81%A3%E7%B8%A3%E5%B8%82%E7%B6%93%E7%B7%AF%E5%BA%A6/
  https://www.pet.gov.tw/PetsMap/Handler_ENRF/MapApiHeat_sp.ashx?Town=&iAddWith={%22ANIMAL%22:%222%22,%22SPAY%22:%222%22,%22SIRE%22:%220%22,%22PETSEX%22:%222%22,%22Color%22:%22G%22,%22ST%22:%222011/01/01%22,%22ED%22:%222021/05/03%22,%22Addr%22:%22%22,%22inpType%22:%22Addr%22
  https://ahis3.baphiq.gov.tw:8080/veter/veter2.htm (Not leverage this yet)
- ## Reference:
  https://kinsta.com/knowledgebase/429-too-many-requests/#what-is-429
- ## Source Code:
  Github: https://github.com/AmyNSL/PET-MEDICAL-SERVICE-IN-TAIWAN
  https://github.com/AmyNSL/AmyNSL.github.io/blob/main/index.html

Return

Thanks For Your Listening!