

# PET MEDICAL SERVICE IN TAIWAN?

...

Presentation: May 16th, 2021  
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# OUTLINE

Motivation

Data Collection and  
Cleaning

Data Analysis and  
Visualization

Challenge & Learning

Reference

# MOTIVATION

# 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.

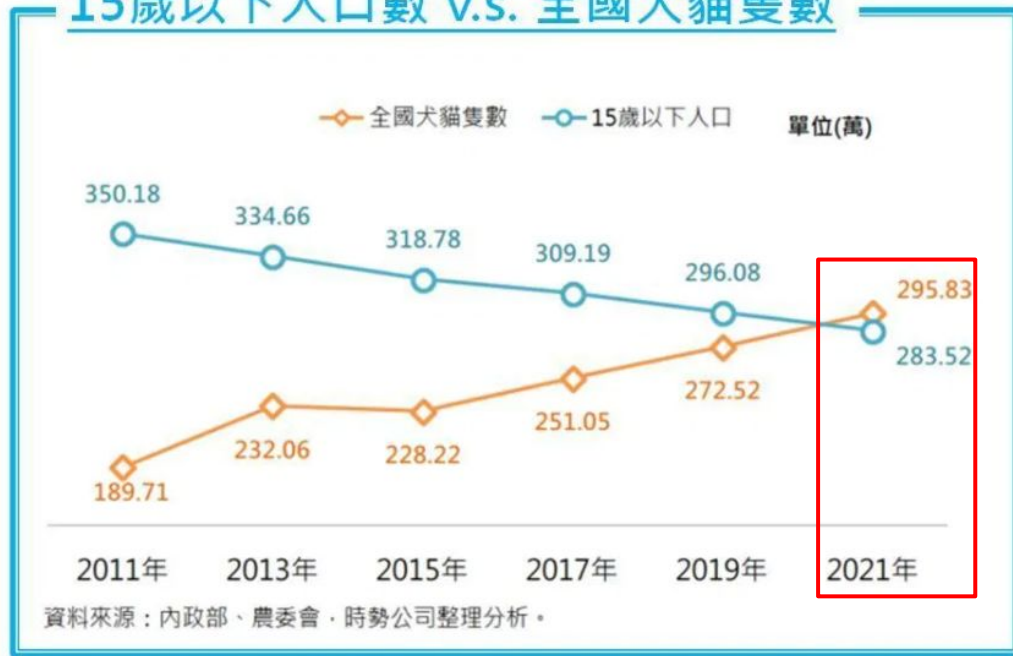
->(refer to attached image on the right hand)

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。

## 15歲以下人口數 v.s. 全國犬貓隻數



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

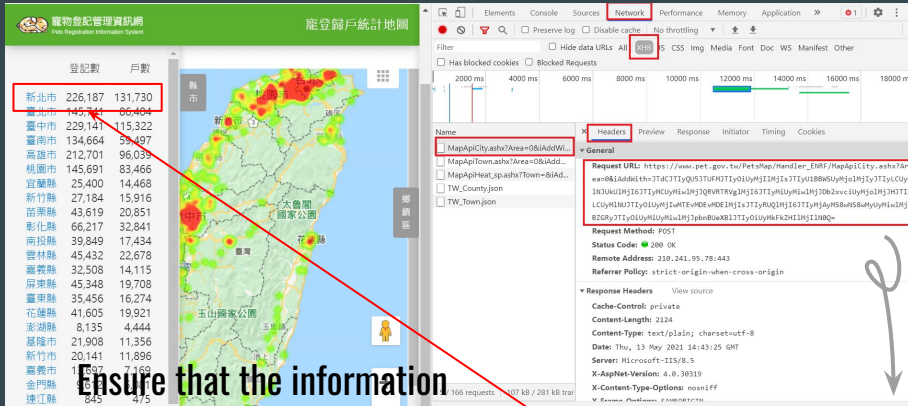
*skip*

Does every breeder have the concept of animal sterilization?

# **DATA COLLECTION and CLEANING**



# 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.

www.pet.gov.tw/PetsMap/Handler\_ENRF/MapApiCity.ashx?Area=0&iAddWith=JTdCJTlyQU5JTUFMTjY0YUyMjllMjlsJTlyU1BB...  
應用程式 Gmail YouTube Travel Tool logistics carrier have fun vesta coursera Tomofun 國語文學科中心-高... Webdesign 閱讀清單

```
[{"CountyOrder":0,"CountyID":"A","CountyName":"新北市","HouseCnt":131730,"cnt":226187,"cnt1":0},{ "CountyOrder":1,"CountyID":"V","CountyName":"臺北市","HouseCnt":86404,"cnt":145741,"cnt1":0},{ "CountyOrder":2,"CountyID":"S","CountyName":"臺中市","HouseCnt":115322,"cnt":229141,"cnt1":0},{ "CountyOrder":3,"CountyID":"U","CountyName":"臺南市","HouseCnt":59497,"cnt":134664,"cnt1":0},{ "CountyOrder":4,"CountyID":"W","CountyName":"高雄市","HouseCnt":96039,"cnt":212701,"cnt1":0},{ "CountyOrder":5,"CountyID":"C","CountyName":"桃園市","HouseCnt":83466,"cnt":145691,"cnt1":0},{ "CountyOrder":6,"CountyID":"B","CountyName":"宜蘭縣","HouseCnt":14468,"cnt":25400,"cnt1":0},{ "CountyOrder":7,"CountyID":"D","CountyName":"新竹縣","HouseCnt":15916,"cnt":27184,"cnt1":0},{ "CountyOrder":8,"CountyID":"E","CountyName":"苗栗縣","HouseCnt":20851,"cnt":43619,"cnt1":0},{ "CountyOrder":9,"CountyID":"G","CountyName":"彰化縣","HouseCnt":32841,"cnt":66217,"cnt1":0},{ "CountyOrder":10,"CountyID":"H","CountyName":"南投縣","HouseCnt":17434,"cnt":39849,"cnt1":0},{ "CountyOrder":11,"CountyID":"I","CountyName":"雲林縣","HouseCnt":22678,"cnt":45432,"cnt1":0},{ "CountyOrder":12,"CountyID":"J","CountyName":"嘉義縣","HouseCnt":14115,"cnt":32508,"cnt1":0},{ "CountyOrder":13,"CountyID":"M","CountyName":"屏東縣","HouseCnt":19708,"cnt":45348,"cnt1":0},{ "CountyOrder":14,"CountyID":"N","CountyName":"臺東縣","HouseCnt":16274,"cnt":35456,"cnt1":0},{ "CountyOrder":15,"CountyID":"O","CountyName":"花蓮縣","HouseCnt":19921,"cnt":41605,"cnt1":0},{ "CountyOrder":16,"CountyID":"P","CountyName":"澎湖縣","HouseCnt":4444,"cnt":8135,"cnt1":0},{ "CountyOrder":17,"CountyID":"Q","CountyName":"基隆市","HouseCnt":11356,"cnt":21908,"cnt1":0},{ "CountyOrder":18,"CountyID":"R","CountyName":"新竹市","HouseCnt":11896,"cnt":20141,"cnt1":0},{ "CountyOrder":19,"CountyID":"T","CountyName":"嘉義市","HouseCnt":7169,"cnt":13697,"cnt1":0},{ "CountyOrder":20,"CountyID":"Y","CountyName":"金門縣","HouseCnt":5081,"cnt":9612,"cnt1":0},{ "CountyOrder":21,"CountyID":"X","CountyName":"連江縣","HouseCnt":475,"cnt":845,"cnt1":0}]
```

# 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"}]

- 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>
</span> <div aria-label="評等為 4.6，最高 5"
span></div> <span class="Eq0J8">(398)</span>
4.6 <span aria-hidden="true" class="Eq0J8 oqSTjd">4.6</span>
(398) <span class="Eq0J8">(398)</span>
地址 <span><span class="BNeawe s3v9rd AP7W"
地址 <span class="BNeawe s3v9rd AP7W"
220新北市板橋區信義路188號 <span><span class="BNeawe s3v9rd AP7W"
span></span>
220新北市板橋區信義路188號 <span class="BNeawe s3v9rd AP7W"
span></span>
```

Google Review Score

```
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=ALeKk03cgwLYEBN18oV0k0P7VGvt
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**

# Major Packages



Requests

---



Pandas

---

Folium



Folium

---

matplotlib

Matplotlib.pyplot

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- 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

- 登記總數和人口分布 (或經濟條件)有一定程度關係
- 每戶平均登記飼養數與居住環境型態有一定程度關係

## 台灣寵物飼養登記概況

全台已登記寵物數量

1570970

平均各縣市登記隻數

71407.7 隻

全台總登記戶數

807010

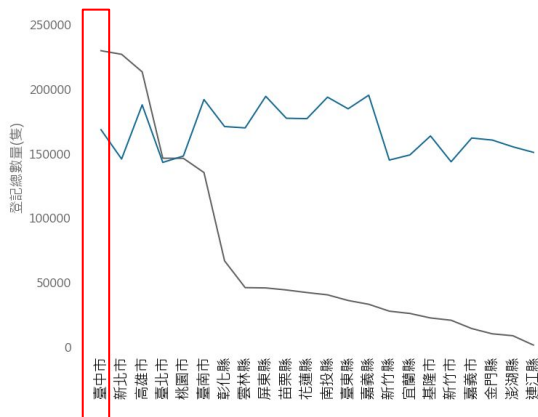
平均各縣市登記戶數

36682.3 戶

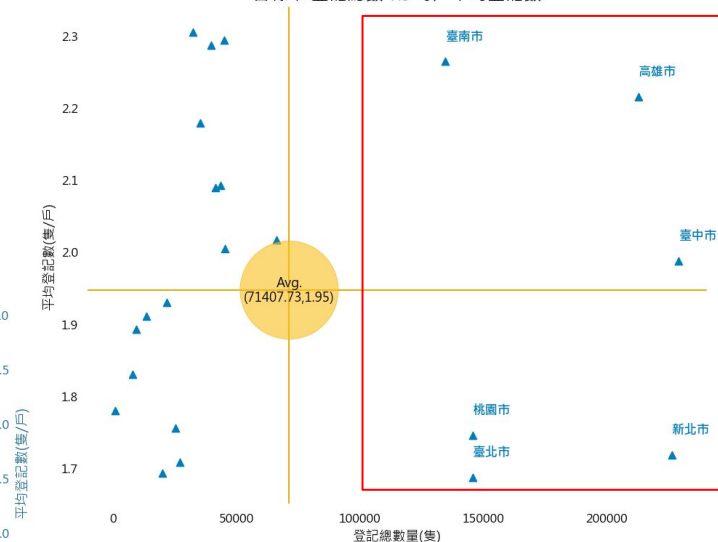
每戶平均登記隻數

1.9 隻

縣市分布概況



各縣市 登記總數 v.s 每戶平均登記數



- 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)

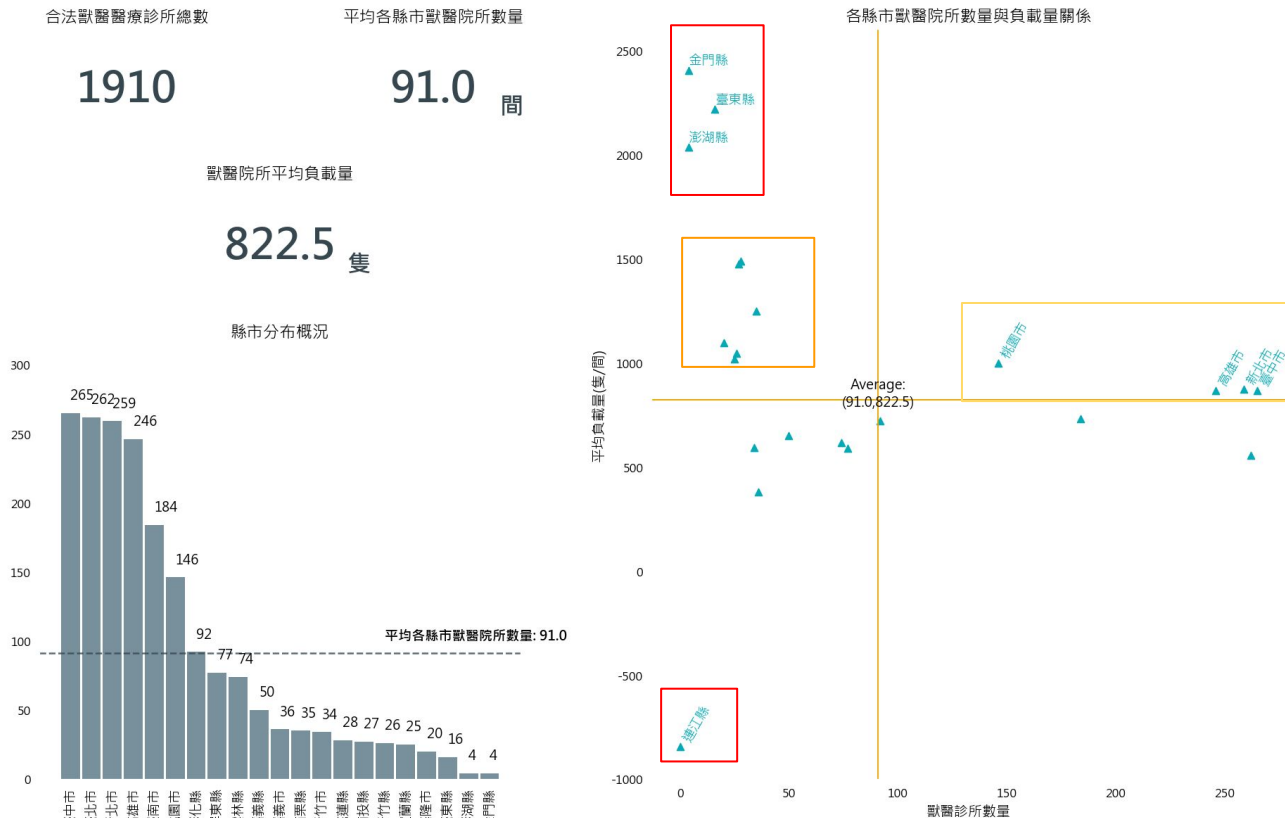
連江縣  
金門縣  
澎湖縣  
台東縣

## 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



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)

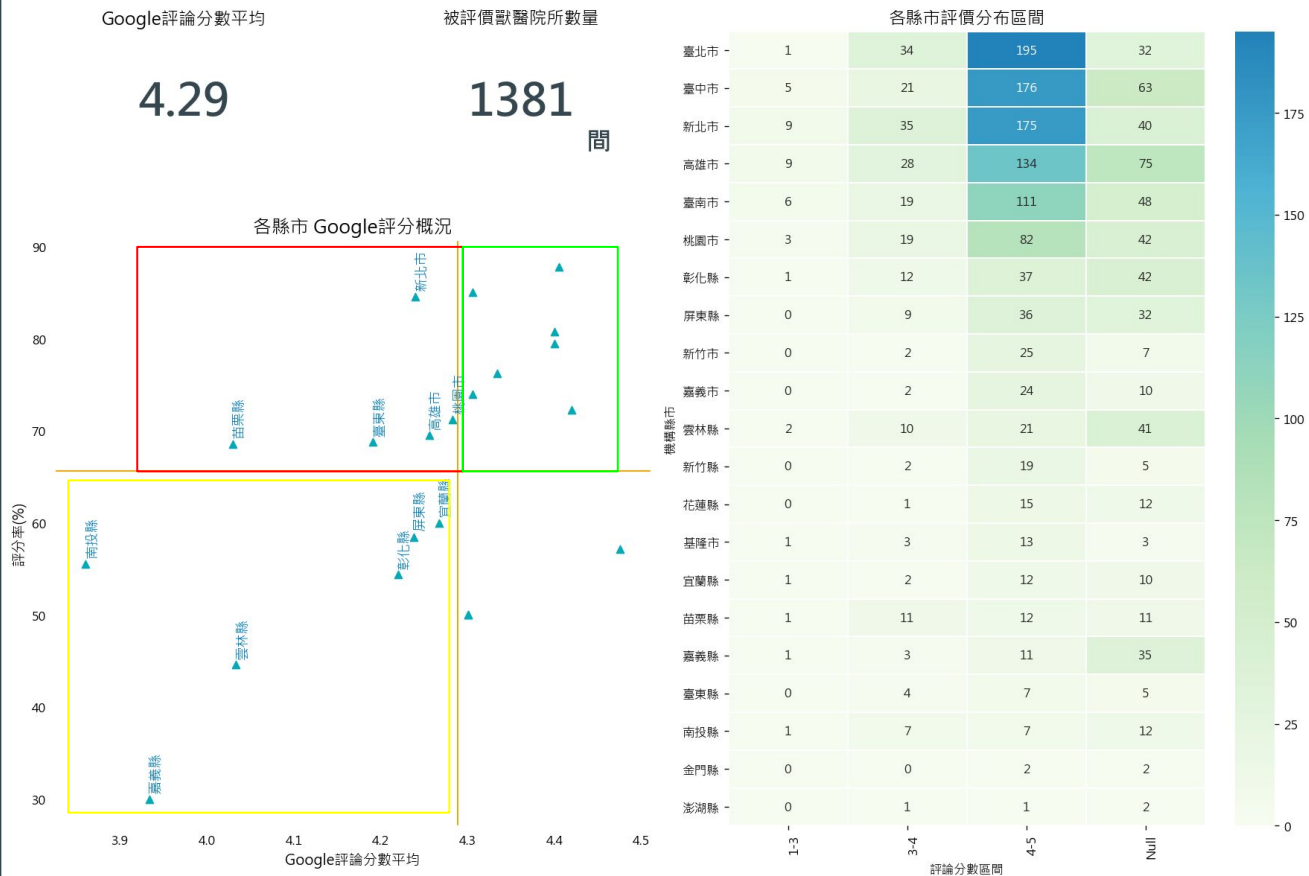
新北市  
桃園市  
高雄市  
台東縣  
苗栗縣

## 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)

### 台灣獸醫院所評分一覽



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**

# Challenge 1 Raise an http error : 429

## What is the HTTP 429 Error? error: 429

Uncertain definition of too many times  
The HTTP 429 error is returned when a user has sent too many requests within a short period of time. The 429 status code is intended for use with rate-limiting schemes.  
Uncertain definition of a short period

### Workaround:

>> Execute the code in next day.

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

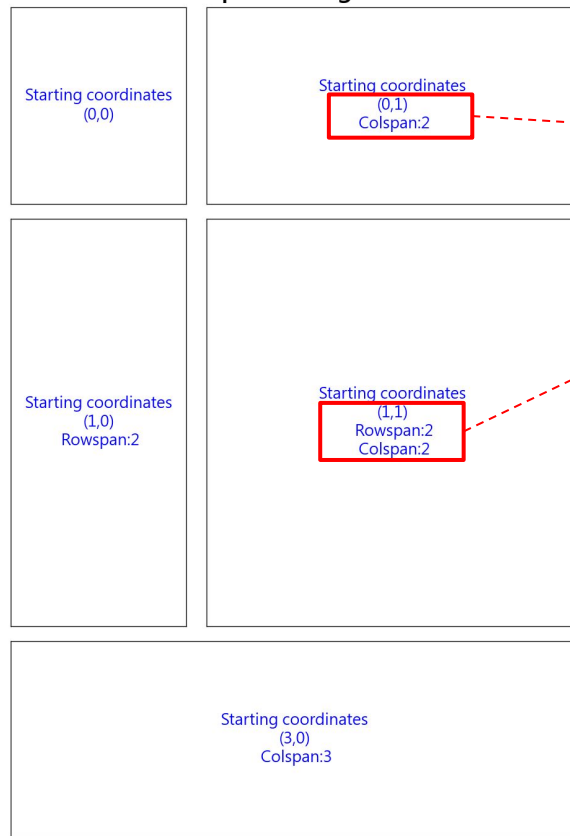
```
#Google Review
for i in range(0,1910):
    print(pd_VMI.iloc[i,4])
    pd_VMI.iloc[i,7]=GoogleReviewScore(pd_VMI.iloc[i,4], 'span', 'Aq14fc')
    if i%200==0:
        pd_VMI.to_csv('pd_VMI.csv',index=False)
        time.sleep(0.08)
pd_VMI.to_csv('pd_VMI.csv',index=False)
```

# Learning 1 How to adjust subplots layout in one figure

Figure-1



Comparison Figure-1



```
'''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 s1 in subplot_list1:
    s1.set_xticks([]) # 不要顯示x軸刻度
    s1.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

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

Index	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']

## Import "Folium" to draw a interactive map.

2

```
# define the national map
national_map = folium.Map(location=[23.9085,120.5995],tiles='cartodbpositron',
                           zoom_start=7,width='100%',height='100%')
colors=['red','yellow','lime','silver']
for lat, lng, label, city, rc, rr in zip(pd_vetclincity['緯度'].values,
                                       pd_vetclincity['經度'].values, pd_vetclincity['機構名稱'].values,
                                       pd_vetclincity['機構縣市'].values, pd_vetclincity['平均評分'].values,
                                       pd_vetclincity['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,
```

## Need to save into html, and use browser to view it.

3

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

# REFERENCE

# 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://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>



**Thanks For  
Your Listening!**

