French given names per year per department

November 16, 2021

0.1 Introduction

The aim of the activity is to develop a methodology to answer a specific question on a given dataset.

The dataset is the set of Firstname given in France on a large period of time. given names data set of INSEE, we choose this dataset because it is sufficiently large, you can't do the analysis by hand, the structure is simple

0.2 1. Import libraries

[61]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import csv


from plotnine import ggplot, aes, labs, geom_point, geom_histogram, geom_bar
```

0.3 2. Download and unzip the file containing the dataset

[9]:

```
import requests

print('Beginning file download with requests')

url = "https://www.insee.fr/fr/statistiques/fichier/2540004/dpt2020_csv.zip"
r = requests.get(url)
print("done")
```

```
done
```

0.4 3. Build the Dataframe from file

First, we read the data from the file dpt2020.csv to save it in a dataframe variable. Then we display the contenant.

The data consists on 5 columns:

1. *Sexe*: Gender

2. *Preusuel*: Firstname
3. *Annais*: Year of birth
4. *dpt*: Name of the department in France
5. *Nombre*: Frequency of people named “preusuel” of gender “sexe” at “annais” in "dpt

[63]:
```
df = pd.read_csv('dpt2020.csv', delimiter=";")
df
```

[63]:
```
         sexe        preusuel annais dpt  nombre
0           1  _PRENOMS_RARES   1900  02       7
1           1  _PRENOMS_RARES   1900  04       9
2           1  _PRENOMS_RARES   1900  05       8
3           1  _PRENOMS_RARES   1900  06      23
4           1  _PRENOMS_RARES   1900  07       9
...       ...             ...    ...  ..     ...
3727548     2             ZYA   2018  59       3
3727549     2             ZYA   XXXX  XX     264
3727550     2            ZYNA   2013  93       3
3727551     2            ZYNA   XXXX  XX      59
3727552     2          ZYNEB    XXXX  XX     119

[3727553 rows x 5 columns]
```

0.5 4. Print the frequency of a given firstname in each year

Here, we display the frequency of a given firstnale in each year. To do that: 1. We get the number of each firstname in each year of birth 2. We delete the rows containings **XXXX** as value in *annais* column 3. We convert values of *annais* column to integer 4. We build a function that takes a firstname as parameter and plot the frequency of this parameter’s value in each year 5. We call this last function multiple times by giving different values to the parameter

0.5.1 4.1. Get the number of each name in each year of birth .

We delete all the useless columns that we don’t need in our processing. And keep only: *preusul*, *annais* and *nombre* columns

[64]:
```
sum_df = df.groupby(['preusuel','annais'], as_index=False).agg({'nombre':␣
 ↪'sum'})
sum_df
```

[64]:
```
       preusuel annais  nombre
0             A   XXXX      27
1         AADAM   XXXX      30
2         AADEL   XXXX      56
3         AADIL   1983       3
4         AADIL   1992       3
...         ...    ...     ...
284252     ÖZGE   XXXX      31
284253    ÖZGÜR   XXXX      25
```

```
284254     ÖZKAN    XXXX      25
284255     ÖZLEM    XXXX     103
284256      ÜMMÜ    XXXX      20

[284257 rows x 3 columns]
```

0.5.2 4.2. Delete the row containing “XXXX” as a value in “annais” column

[65]:

```python
sum_df.drop(sum_df[ sum_df['annais'] == "XXXX" ].index, inplace=True)
sum_df
```

[65]:

```
       preusuel annais  nombre
3         AADIL   1983       3
4         AADIL   1992       3
6         AAHIL   2016       3
11       AALIYA   2017       3
13      AALIYAH   2001       9
...         ...    ...     ...
284246     ÖMER   2016      18
284247     ÖMER   2017      30
284248     ÖMER   2018      31
284249     ÖMER   2019      37
284250     ÖMER   2020      24

[249247 rows x 3 columns]
```

0.5.3 4.3. Convert the type of values of “annais” to integer

[66]:

```python
sum_df = sum_df.astype({'annais': 'int64'})
```

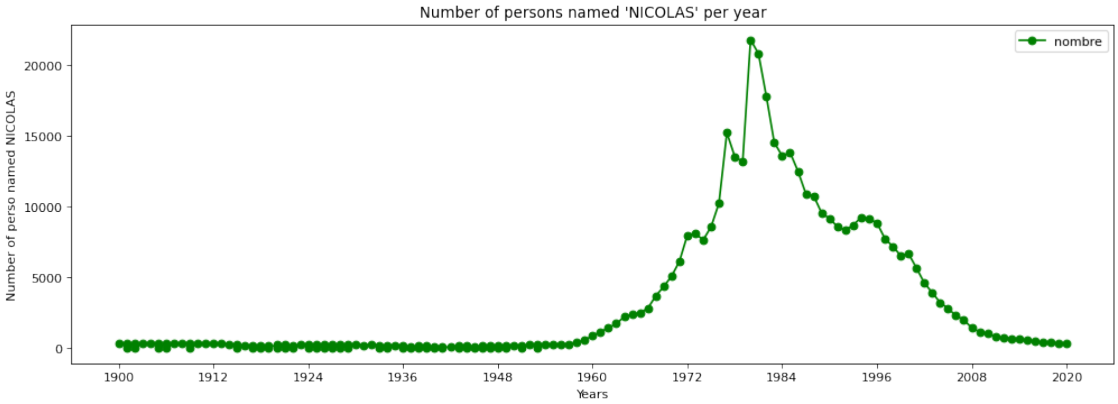
0.5.4 4.4. Build a function to plot a number of a name set as a parameter of the function in each year

[67]:

```python
def plotSpecName(name):

    specNamef = sum_df.loc[sum_df["preusuel"]== name ] #Select the rows containing name as value in preusuel column

    plt.figure(figsize=(15, 5), dpi=80)
    list_annais = list(specNamef["annais"]) #Save all the values of *annais* column = year of birth
    plt.plot(list_annais , list(specNamef["nombre"]),'-bo' , color = 'g', label="nombre" ) #Set year of birth in x-axis and the frequency in y-axis
    plt.xticks( np.arange(min(list_annais), max(list_annais)+1,␣
↪int((max(list_annais)+1-min(list_annais))/10)))# display only few year of␣
↪birth so as not to clutter up the graph

    plt.ylabel("Number of perso named {}".format(name))
    plt.xlabel("Years")
    plt.title("Number of persons named '{}' per year".format(name))
    plt.legend()
    plt.show()
```

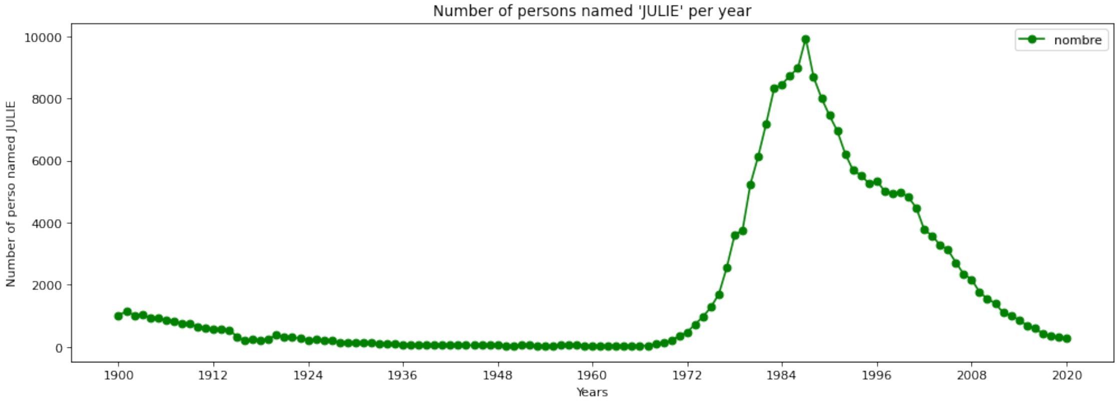
0.5.5 4.5. Plot the graph showing the frequency of a given name in each year

[35]:
```
plotSpecName("NICOLAS")
```



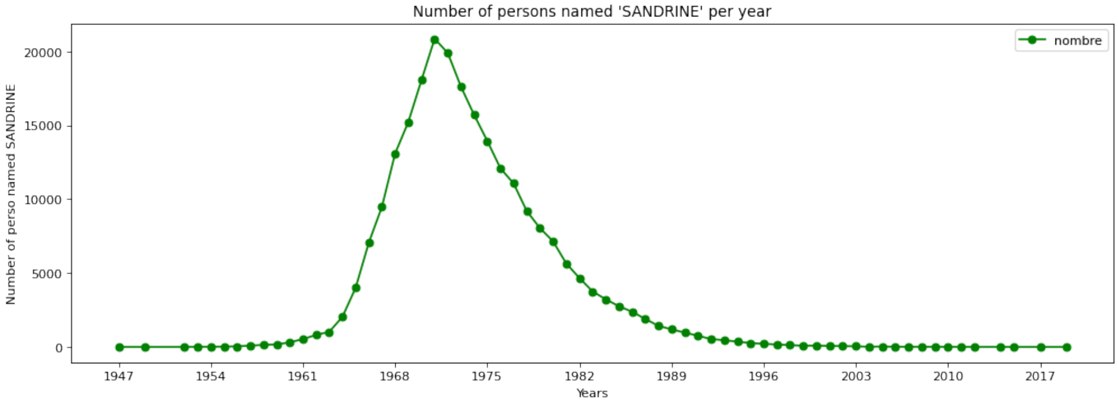
The figure above shows that the frequency of people named **NICOLAS** born between 1900-1972 was not that big. But in 1972, this number started increasing to reach the top at 1982 where this frequency has excedeed 20000 people. And, since this year, it has slowly decreased to become as it was before 1972. In addition, we can also notice that the name of **NICOLAS** was used almost each year before 1968. However, after that the name disappeared few years to appear with a bigger frequency than how it was. This phenomena continued until 1982, where even if the name disappered during few years but when it appears it was with a less value.

[40]:
```
plotSpecName("JULIE")
```



This second figure shows that the frequency of people named **JULIE** has almost the same variation as **NICOLAS**. Except that the top it reaches was half of **NICOLAS**' top frequency

[42]:
```
plotSpecName("SANDRINE")
```



This third figure shows that the firstname **SANDRINE** was not that famous. It was used only during few years and most of the time, it was used with a small frequecy. Except during the years between 1968 and 1979

0.6 5. Print by gender, the most given firstname by year.

0.6.1 5.1 Redo the same thing as above but with keeping the column "*sexe*"

[11]:
```
sum_df = df.groupby(['annais','preusuel', "sexe"], as_index=False).nombre.sum()
sum_df.drop( sum_df[ sum_df['annais'] == "XXXX" ].index , inplace=True)
sum_df = sum_df.astype({'annais': 'int64'})
```

[12]:
```
famousNameYearf  = sum_df.loc[sum_df.groupby(["annais", 'sexe'])["nombre"].
  ↪idxmax()]
famousNameYearf
```

[12]:

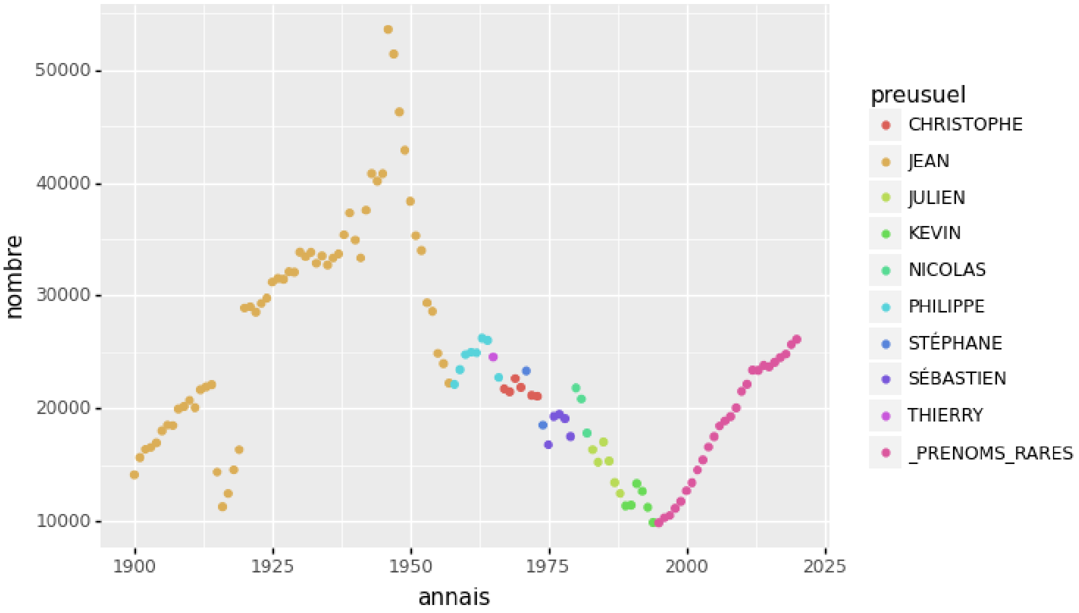
```
        annais         preusuel  sexe  nombre
554       1900             JEAN     1   14097
679       1900            MARIE     2   48713
1614      1901             JEAN     1   15634
1754      1901            MARIE     2   52150
2717      1902             JEAN     1   16364
...        ...              ...   ...     ...
248797    2018  _PRENOMS_RARES     2   26513
253204    2019  _PRENOMS_RARES     1   25659
253205    2019  _PRENOMS_RARES     2   27330
257532    2020  _PRENOMS_RARES     1   26109
257533    2020  _PRENOMS_RARES     2   27800

[242 rows x 4 columns]
```

0.6.2 5.2. Plot the most given male firstname by year.

[32]:

```
famousNameYearSexef = famousNameYearf[famousNameYearf["sexe"]==1] #Select rows␣
 ↪within sexe == 1 refering to Male

print(famousNameYearSexef.groupby('preusuel').agg({"annais": 'min'}).
 ↪reset_index().sort_values(by=['annais'])) #Print the result

ggplot(famousNameYearSexef, aes(x="annais", y="nombre", color="preusuel")) +␣
 ↪geom_point() #Plot the graph
```

```
         preusuel  annais
1            JEAN    1900
5        PHILIPPE    1958
8         THIERRY    1965
0     CHRISTOPHE    1967
6        STÉPHANE    1971
7       SÉBASTIEN    1975
4         NICOLAS    1980
2          JULIEN    1983
3           KEVIN    1989
9  _PRENOMS_RARES    1995
```



[32]: `<ggplot: (-9223371894925233320)>`

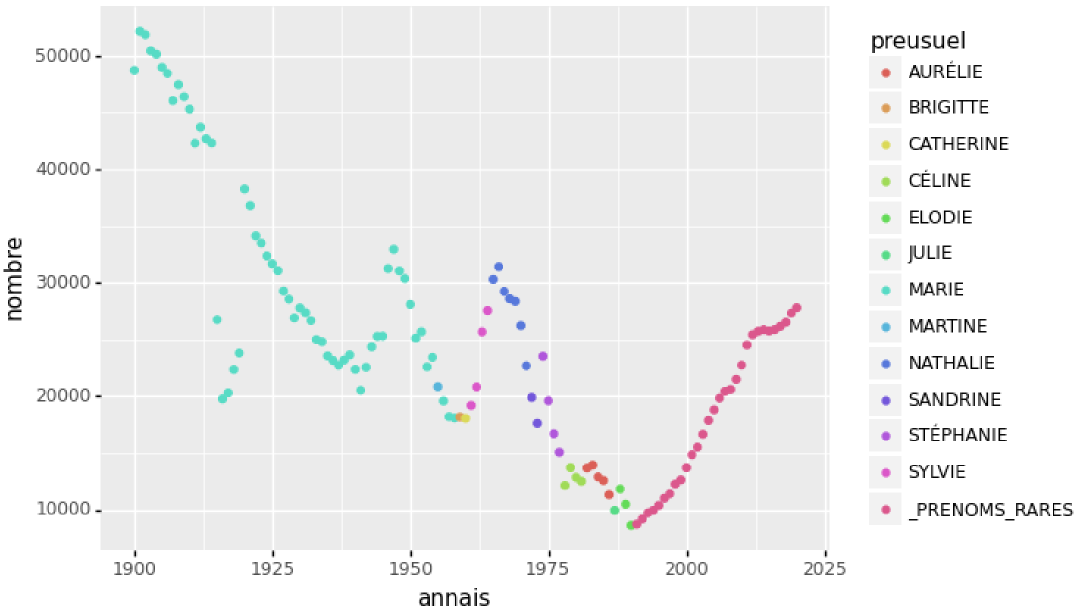
This graph shows that from 1900 to 1956, there was not any diversification of firstname. Because during all these years the most used one was always **JEAN**. However, since 1962, we notice an important diversification.

0.6.3 5.3. Plot the most given female firstname by year.

[33]:
```
famousNameYearSexef = famousNameYearf[famousNameYearf["sexe"]==2]  #Select rows␣
 ↪within sexe == 2 refering to Female
print(famousNameYearSexef.groupby('preusuel').agg({"annais": 'min'}).
 ↪reset_index().sort_values(by=['annais']))

ggplot(famousNameYearSexef, aes(x="annais", y="nombre", color="preusuel")) +␣
 ↪geom_point()
```

```
        preusuel  annais
6          MARIE    1900
7        MARTINE    1955
1       BRIGITTE    1959
2      CATHERINE    1960
11        SYLVIE    1961
8       NATHALIE    1965
9       SANDRINE    1972
10     STÉPHANIE    1974
3         CÉLINE    1978
0        AURÉLIE    1982
```

```
5            JULIE    1987
4           ELODIE    1988
12   _PRENOMS_RARES    1991
```



[33]:
```
<ggplot: (-9223371894925562101)>
```

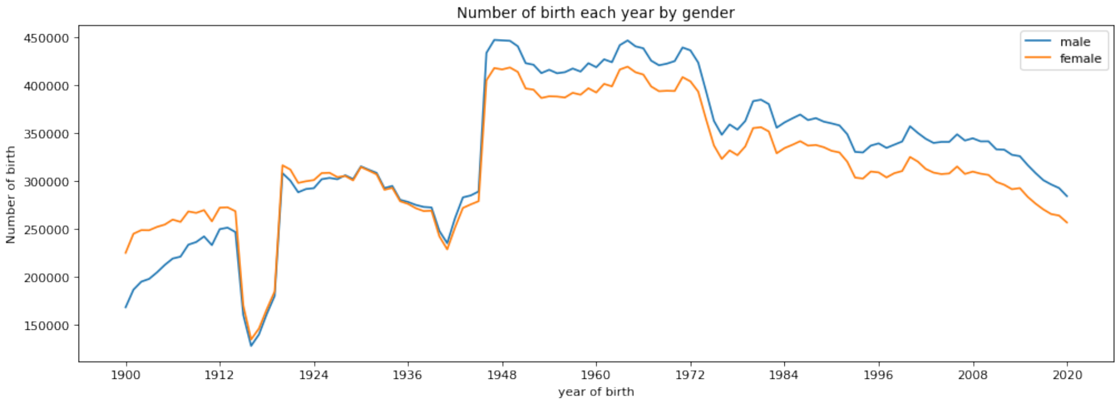
This graph plotting the most used female firstnames each year shows almost the same variations as the one plotting the most used male firsnames. However, the most used firstname during a long period between 1900 - 1962 was **MARIE** and this firstname with reference to the Virgin may be explained by the fact that christianity at this period was stronly present on a daily basis.

0.7 6. Print number of birth each year by gender

0.7.1 6.1. Redo the same thing as above but with deleting "*Preusuel'* column

[24]:
```
sum_df = df.groupby(["annais", "sexe"], as_index=False).nombre.sum()
sum_df.drop(sum_df[ sum_df['annais'] == "XXXX" ].index, inplace=True)
sum_df = sum_df.astype({'annais': 'int64'})



sum_df_male =sum_df[sum_df["sexe"]==1]
sum_df_female =sum_df[sum_df["sexe"]==2]

list_annais = list(sum_df_male["annais"])

plt.figure(figsize=(15, 5), dpi=80)
plt.plot(list(sum_df_male["annais"]), list(sum_df_male["nombre"]), label="male")
plt.plot (list(sum_df_female["annais"]), list(sum_df_female["nombre"]),␣
 ↪label="female")
plt.xticks( np.arange(min(list_annais), max(list_annais)+1,␣
 ↪int((max(list_annais)+1-min(list_annais))/10)))


plt.xlabel("year of birth")
plt.ylabel("Number of birth")
plt.title("Number of birth each year by gender")
plt.legend()
```

[24]:
```
<matplotlib.legend.Legend at 0x20608fe19e8>
```



From the figure above, we can observe a sudden drops during 1914-1920 and also between 1939-1945 corresponding to the 2 world wars periods

And in 1948, we see an exponential increase if the number of birth which may also be explained by the encouragement of french government to immigration from foreign countries to France.

0.8 7. Print the frequency of the most used firstnames in each department

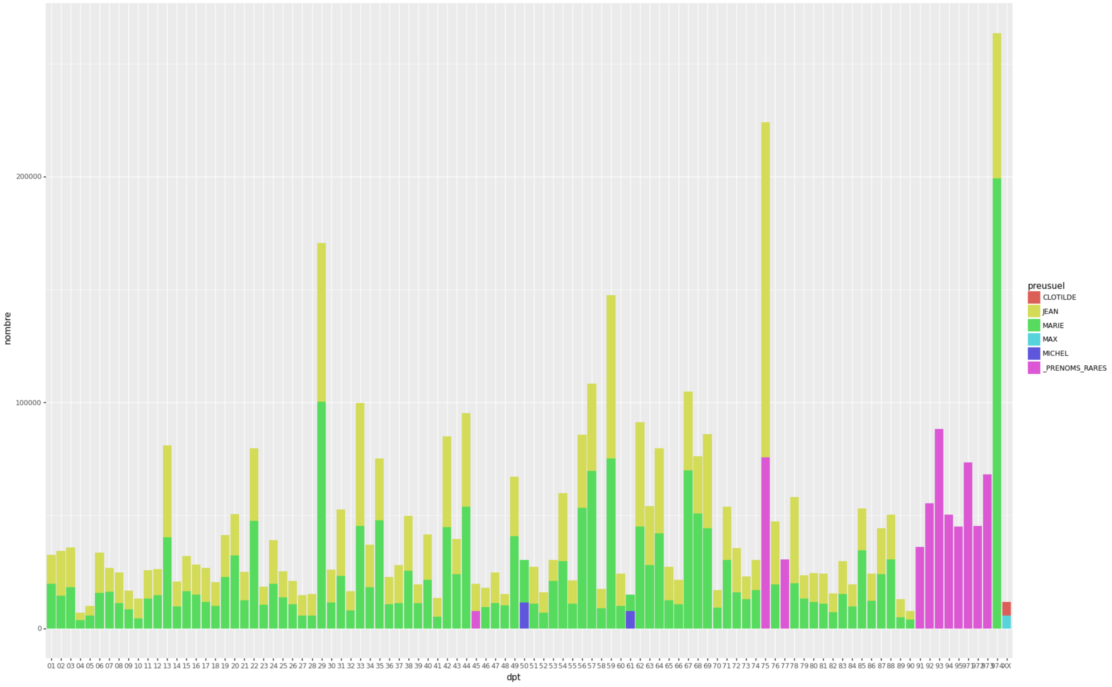
[31]:
```
sum_df = df.groupby(['preusuel',"sexe",'dpt'], as_index=False).agg({'nombre':␣
 ↪'sum'})
sum_df
```

[31]:
```
       preusuel  sexe dpt  nombre
0             A     1  XX      27
1         AADAM     1  XX      30
2         AADEL     1  XX      56
3         AADIL     1  84       3
4         AADIL     1  92       3
...         ...   ...  ..     ...
277015     ÖZGE     2  XX      31
277016    ÖZGÜR     1  XX      25
277017    ÖZKAN     1  XX      25
```

```
277018     ÖZLEM      2  XX      103
277019      ÜMMÜ      2  XX       20

[277020 rows x 4 columns]
```

[32]:
```
famousNameDptSexef  = sum_df.loc[sum_df.groupby(['dpt', 'sexe'])["nombre"].
 ↪idxmax()]
```

[58]:
```
(ggplot(famousNameDptSexef, aes(x="dpt", y="nombre", fill="preusuel"))
        +geom_bar(stat='identity')
        + theme(figure_size = (22, 15)))
```



[58]: `<ggplot: (139056803094)>`

Finally, this last figure shows that from 1900 to 2020 the male firstname **JEAN** and the femal firstname **MARIE** was used in 90% of departments of fance. The remaining 10%, we found mostly rare firstnames or **MICHEL** as male firstname.

So, as a conclusion, I think that indeed, there's a correlation between departments and firstnames.

[ ]: