Práctica - Aplicación del Muestreo

Victor Sanchez Dataset: Anime List Dataset

En esta práctica compararemos la eficacia de aplicar un muestreo estratificado sobre la puntuación o score de una lista de animes, respecto a un muestreo por conveniencia.

```
#Librerias basicas
import pandas as pd
import numpy as np
import math as mt
import matplotlib.pyplot as plt
from sklearn.ensemble import RandomForestClassifier
from sklearn import preprocessing
from sklearn.metrics import accuracy_score
from sklearn.model_selection import StratifiedShuffleSplit

from google.colab import files
uploaded = files.upload()

#Lectura de archivo
Anime_DB = pd.read_csv("anime-filtered.csv",delimiter = ",")
Anime_DB.head()
```

```
   anime_id                              Name  Score  \
0         1                      Cowboy Bebop   8.78
1         5  Cowboy Bebop: Tengoku no Tobira   8.39
2         6                            Trigun   8.24
3         7             Witch Hunter Robin   7.27
4         8                 Bouken Ou Beet   6.98

                                          Genres
English name  \
0    Action, Adventure, Comedy, Drama, Sci-Fi, Space            Cowboy
Bebop
1             Action, Drama, Mystery, Sci-Fi, Space  Cowboy Bebop:The
Movie
2  Action, Sci-Fi, Adventure, Comedy, Drama, Shounen
Trigun
3  Action, Mystery, Police, Supernatural, Drama, ...      Witch Hunter
Robin
4         Adventure, Fantasy, Shounen, Supernatural  Beet the Vandel
Buster

                     Japanese name  \
0                        カウボーイビバップ
1                   カウボーイビバップ 天国の扉
2                            トライガン
3  Witch Hunter ROBIN (ウイッチハンターロビン)
```

```
4                                冒険王ビィト

                                                sypnopsis   Type
Episodes  \
0  In the year 2071, humanity has colonized sever...     TV       26

1  other day, another bounty—such is the life of ...  Movie        1

2  Vash the Stampede is the man with a $$60,000,0...     TV       26

3  ches are individuals with special powers like ...     TV       26

4  It is the dark century and the people are suff...     TV       52


                          Aired  ...         Duration  \
0   Apr 3, 1998 to Apr 24, 1999  ...  24 min. per ep.
1                   Sep 1, 2001  ...    1 hr. 55 min.
2   Apr 1, 1998 to Sep 30, 1998  ...  24 min. per ep.
3   Jul 2, 2002 to Dec 24, 2002  ...  25 min. per ep.
4  Sep 30, 2004 to Sep 29, 2005  ...  23 min. per ep.

                           Rating  Ranked Popularity  Members
Favorites  \
0  R - 17+ (violence & profanity)    28.0         39  1251960
61971
1  R - 17+ (violence & profanity)   159.0        518   273145
1174
2       PG-13 - Teens 13 or older   266.0        201   558913
12944
3       PG-13 - Teens 13 or older  2481.0       1467    94683
587
4                   PG - Children  3710.0       4369    13224
18

  Watching  Completed  On-Hold  Dropped
0   105808     718161    71513    26678
1     4143     208333     1935      770
2    29113     343492    25465    13925
3     4300      46165     5121     5378
4      642       7314      766     1108

[5 rows x 25 columns]
```

```
#Se remueven los animes de tipo no identificado: 36 desconocidos
indexType = Anime_DB[ Anime_DB['Type'] == 'Unknown'].index
Anime_DB.drop(indexType , inplace=True)

#Se obtiene el tamaño de cada estrato
InfoType = Anime_DB.groupby(['Type'], as_index=False).size()
```

```
InfoType.columns = ['Type','Size']
InfoType
```

```
      Type  Size
0    Movie  2636
1    Music   744
2      ONA  1531
3      OVA  3364
4  Special  1991
5       TV  4650
```

```
#De cada estrato se obtiene su respectiva media y se pondera para
obtener la media poblacional
#(en función del tamaño de los estratos)
InfoScore = pd.DataFrame(Anime_DB.groupby(['Type'], as_index=False)
['Completed'].mean())
InfoScore.columns = ['Type','ScoreA']
ResumeDB = pd.merge(InfoType, InfoScore, on="Type")
ResumeDB['Apond'] = ResumeDB['Size']/len(Anime_DB)*ResumeDB['ScoreA']
popmean = ResumeDB['Apond'].sum()
popmean
```

```
26005.710713327968
```

```
#A partir de aquí se obtiene una muestra aleatoria estratificada del
20% con una asignación proporcional, es decir ni =Ni/N
Anime_DBSample1 = Anime_DB.groupby('Type',
group_keys=False).apply(lambda x:
x.sample( mt.ceil( (len(x)/len(Anime_DB))*mt.ceil(len(Anime_DB)*0.2) )
))
```

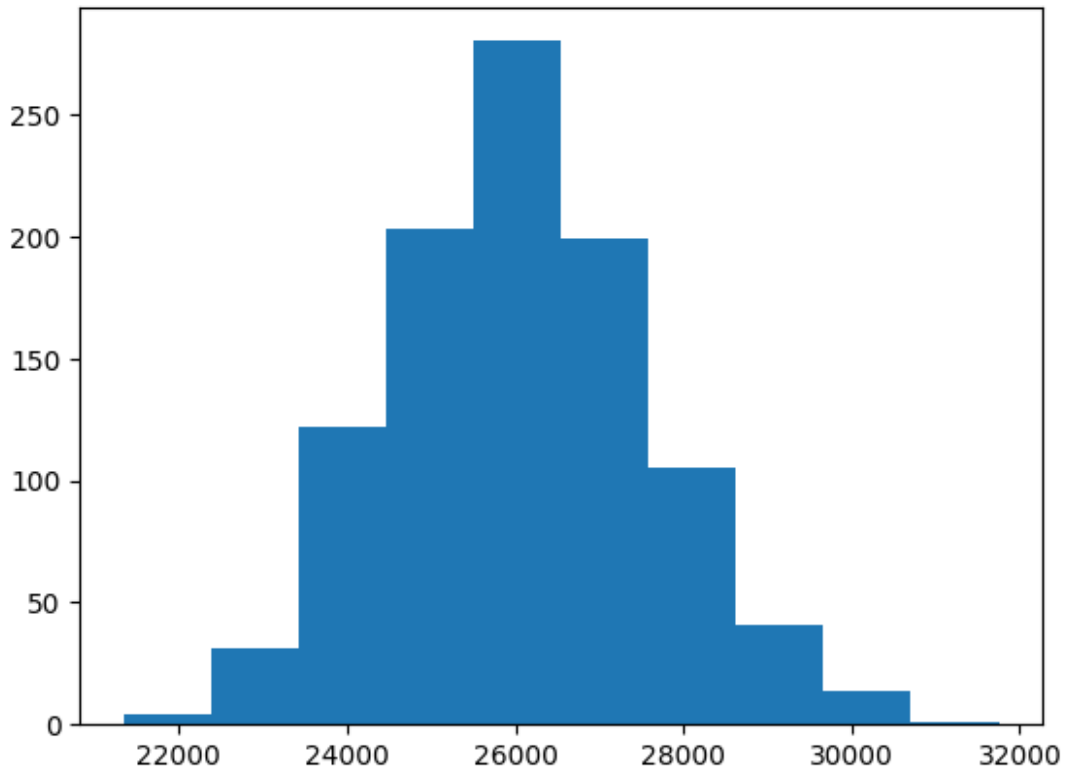
```
#Se obtiene la media estratificada estimada para la muestra
seleccionada
InfoTypeSample1 = Anime_DBSample1.groupby(['Type'],
as_index=False).size()
InfoTypeSample1.columns = ['Type','Size']
InfoScoreSample1 = pd.DataFrame(Anime_DBSample1.groupby(['Type'],
as_index=False)['Completed'].mean())
InfoScoreSample1.columns = ['Type','ScoreA']
ResumeDBSample1 = pd.merge(InfoTypeSample1, InfoScoreSample1,
on="Type")
ResumeDBSample1['Apond'] =
ResumeDBSample1['Size']/len(Anime_DBSample1)*ResumeDBSample1['ScoreA']
samplemean = ResumeDBSample1['Apond'].sum()
samplemean
```

```
28753.200200870437
```

```
#¿Y si probamos la Ley de los Grandes Números? en conjunto con el
Teorema del Límite Central
n_iter = 1000
samplemeans_array = np.zeros(n_iter)
```

```
#filling the array with loop
for i in range(0,n_iter):
    Anime_DBSample1 = Anime_DB.groupby('Type',
group_keys=False).apply(lambda x:
x.sample( mt.ceil( (len(x)/len(Anime_DB))*mt.ceil(len(Anime_DB)*0.2) )
))
    InfoTypeSample1 = Anime_DBSample1.groupby(['Type'],
as_index=False).size()
    InfoTypeSample1.columns = ['Type','Size']
    InfoScoreSample1 = pd.DataFrame(Anime_DBSample1.groupby(['Type'],
as_index=False)['Completed'].mean())
    InfoScoreSample1.columns = ['Type','ScoreA']
    ResumeDBSample1 = pd.merge(InfoTypeSample1, InfoScoreSample1,
on="Type")
    ResumeDBSample1['Apond'] =
ResumeDBSample1['Size']/len(Anime_DBSample1)*ResumeDBSample1['ScoreA']
    samplemean = ResumeDBSample1['Apond'].sum()
    samplemeans_array[i] = samplemean #filling  x_array

plt.hist(samplemeans_array)
plt.show()
```




```
#Media muestral estimada
samplemeans_array.mean()
```

```
26055.904215266153
```

```
#Margen de Error (en porcentaje)
abs(popmean-samplemeans_array.mean())/samplemeans_array.mean()*100
```

```
0.1926377281843744
```

```
#¿Y si el muestreo es por conveniencia? Buscando generar una
estadística falsa de que los animes cuentan con un buen número
promedio de espectadores que los completan
Anime_DBSample2 = Anime_DB[ Anime_DB['Ranked'] >
mt.ceil(len(Anime_DB)*0.2)  ]
InfoTypeSample2 = Anime_DBSample2.groupby(['Type'],
as_index=False).size()
InfoTypeSample2.columns = ['Type','Size']
InfoScoreSample2 = pd.DataFrame(Anime_DBSample1.groupby(['Type'],
as_index=False)['Completed'].mean())
InfoScoreSample2.columns = ['Type','ScoreA']
ResumeDBSample2 = pd.merge(InfoTypeSample2, InfoScoreSample2,
on="Type")
ResumeDBSample2['Apond'] =
ResumeDBSample2['Size']/len(Anime_DBSample2)*ResumeDBSample2['ScoreA']
samplemean2 = ResumeDBSample2['Apond'].sum()
samplemean2
```

```
24778.614498242325
```

```
#Margen de Error (en porcentaje)
abs(popmean-samplemean2)/samplemean2*100
#Nota: El margen de error no tiene relevancia estadísitica en este
segundo muestreo al provenir de una muestra no probabílistica, por lo
que se sugiere omitirlo
```

```
4.952239017127804
```