intro-to-data-science-confidence-interval

April 25, 2020

[31]:
```python
# This Python 3 environment comes with many helpful analytics libraries␣
↪installed
# It is defined by the kaggle/python docker image: https://github.com/kaggle/
↪docker-python
# For example, here's several helpful packages to load in

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)
import matplotlib.pyplot as plt
# Input data files are available in the "../input/" directory.
# For example, running this (by clicking run or pressing Shift+Enter) will list␣
↪all files under the input directory

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

# Any results you write to the current directory are saved as output.
```

```
/kaggle/input/coffee_dataset.csv
```

[32]:
```python
# our complete dataset
coffee_full = pd.read_csv('/kaggle/input/coffee_dataset.csv')
coffee_full.head()
```

[32]:

	user_id	age	drinks_coffee	height
0	4509	<21	False	64.538179
1	1864	>=21	True	65.824249
2	2060	<21	False	71.319854
3	7875	>=21	True	68.569404
4	6254	<21	True	64.020226

[33]:
```python
np.random.seed(42)

#this is the only data you might actually get in the real world.
#lets build confidence interval based on the sample dataset
```

```
coffee_sample = coffee_full.sample(200)
coffee_sample.head()
print(coffee_sample.shape)
display(coffee_sample.head())
```

(200, 4)

	user_id	age	drinks_coffee	height
2402	2874	<21	True	64.357154
2864	3670	>=21	True	66.859636
2167	7441	<21	False	66.659561
507	2781	>=21	True	70.166241
1817	2875	>=21	True	71.369120

1. What is the proportion of coffee drinkers in the sample?
2. What is the proportion of individuals that don't drink coffee?

[34]:
```
#drink coffee
coffee_sample['drinks_coffee'].mean()
```

[34]: 0.595

[35]:
```
#dont drink coffee
1 - coffee_sample['drinks_coffee'].mean()
```

[35]: 0.405

[36]:
```
#average height of that individual who drink coffee
filter_True = coffee_sample['drinks_coffee'] == True
sample_tmp = coffee_sample[filter_True]
avg_height = sample_tmp['height'].mean()
print(avg_height)
```

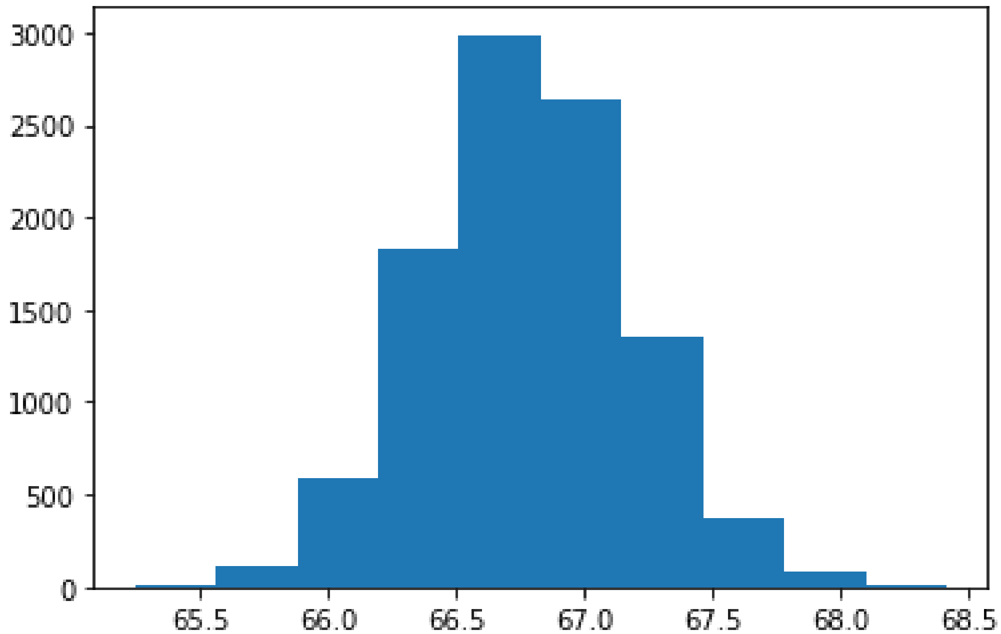
68.11962990858618

Now simulate your bootstrap sample 10,000 times and take the mean height of the** non-coffee** drinkers in each sample. Plot the distribution, and pull the values necessary for a 95% confidence interval. What do you notice about the sampling distribution of the mean in this example?

[37]:
```
boots_mean = []
for i in range(10000):
    boots_sample = coffee_sample.sample(200, replace=True)
    sample_mean = boots_sample[boots_sample['drinks_coffee'] ==␣
 ↪False]['height'].mean()
    boots_mean.append(sample_mean)

#plot sample means
plt.hist(boots_mean)
```

```
plt.show()
```



[40]:
```
#since we dont have the population data we have to cut 2.5% from botton and top

np.percentile(boots_mean, 2.5), np.percentile(boots_mean, 97.5)
```

[40]: (65.9929132815752, 67.58402738281573)

0.0.1 You can interpret your confidence interval as We are 95% confident, that the mean height of all non-coffee-drinker is between 65.99 to 67.59.

[41]:
```
#lets caclulate the non-coffee-drinker height from our actual data
coffee_full[coffee_full['drinks_coffee']==False]['height'].mean()
```

[41]: 66.44340776214705