Interval estimation

Notebook:	INIAD Statistics		
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What does this mean?

- Depend on already known data, estimate the range of possible mean of the entire data set(This data set must be nominal distribution)

How to find with 95% accurate?

Checking hypothesis (No different from calculate 95% data set)

- -1.96 <= (x −μ) / σ <= 1.96 **--->** -1.96*σ+μ <= x <= 1.96*σ+μ
  - μ: mean of data set
  - σ: standard deviation of data set

Finding range of possible mean (Already known SD Standard Deviation)

$$-1.96 \leq \frac{\bar{X} - \mu}{\frac{\sigma}{\sqrt{n}}} \leq +1.96$$

$$\bar{X} - 1.96 \times \frac{\sigma}{\sqrt{n}} \leq \mu \leq \bar{X} + 1.96 \times \frac{\sigma}{\sqrt{n}}$$

- μ: mean of data set
- σ: standard deviation of data set
- X bar: mean of already known data set
- 95PercentResultRange.py 2.2 KB
- Why 1.96

```
from scipy.stats import norm
print(norm.ppf(0.975), norm.ppf(0.025))
#1.959963984540054 -1.9599639845400545
```

Finding range of possible mean (Unknown Standard Deviation)

$$S^2 = \frac{\sum_{i=1}^{n} (X_i - \bar{x})^2}{n-1}$$

$$\bar{X} - t_{n-1}\left(\frac{0.05}{2}\right) \times \frac{S}{\sqrt{n}} \leq \mu \leq \bar{X} + t_{n-1}\left(\frac{0.05}{2}\right) \times \frac{S}{\sqrt{n}}$$

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