Discrete Distributions

Bernoulli Distribution

- Two possible outcomes : Failure/Success, Churn/Not Churn, Male/Female

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Ex. Probability of a Churning Customer being a female?

Bernoulli Distribution

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Bernoulli Distribution

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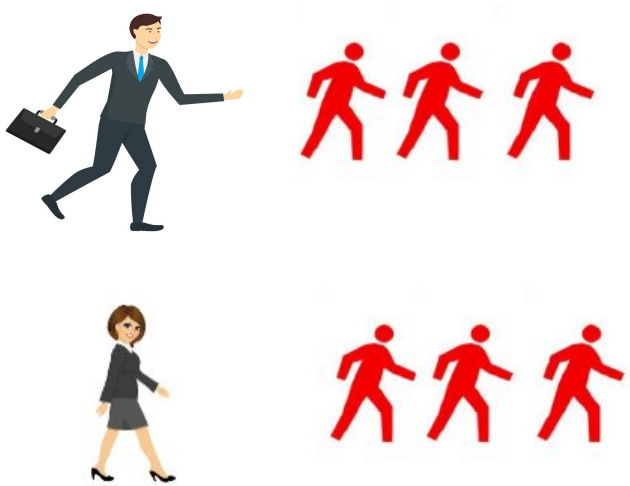

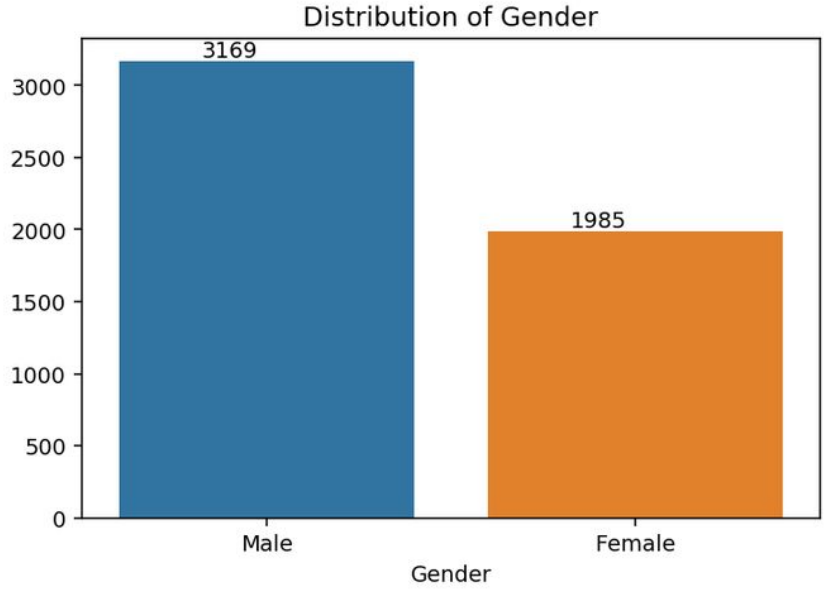

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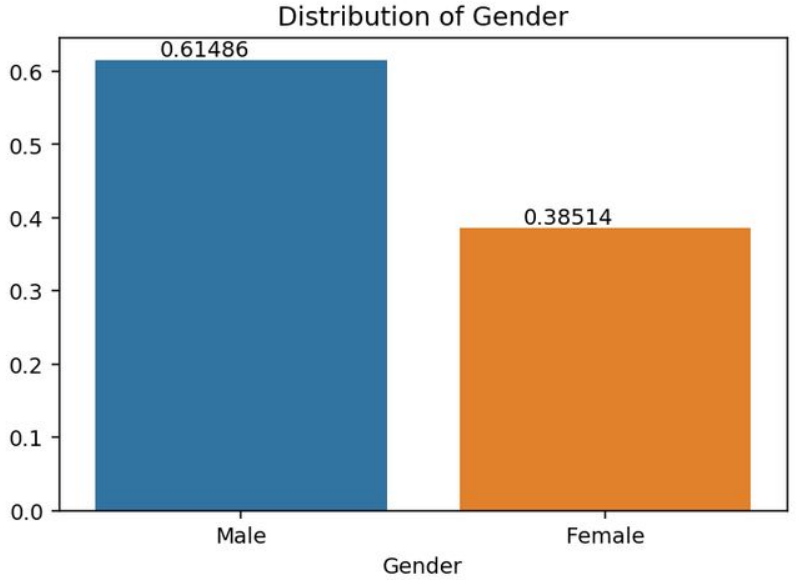
Bernoulli Distribution

Ex. Probability of a Churning Customer being a female?



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Categorical Distribution

- If two possible outcomes → Bernoulli

Categorical Distribution

- If two possible outcomes → Bernoulli
- If more than two possible outcomes → Categorical

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Ex. Probability of Churning Customer being a Student?

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Categorical Distribution

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Categorical Distribution

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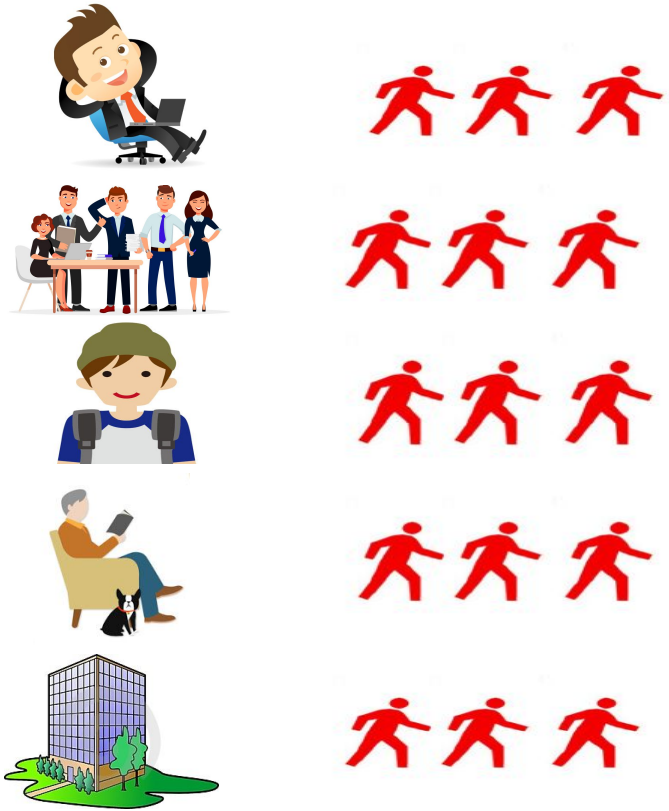

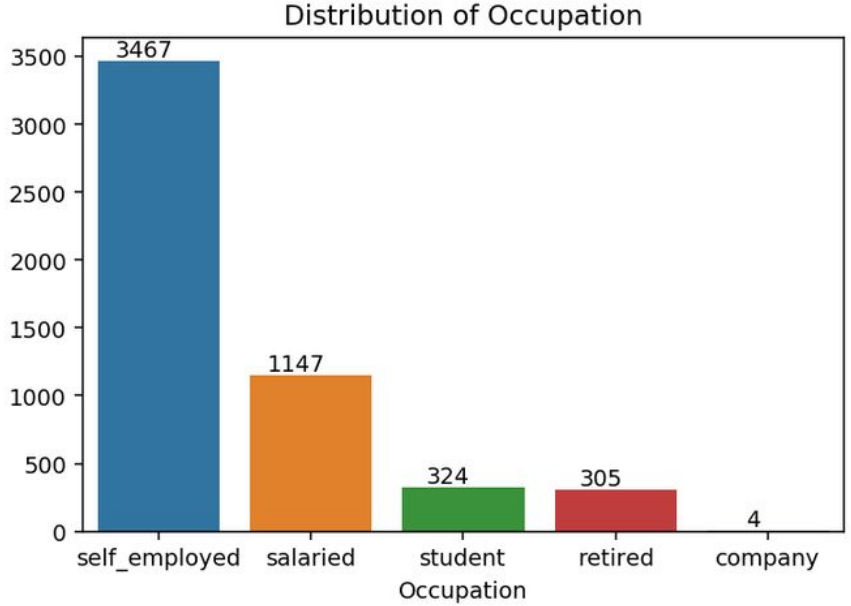

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Categorical Distribution

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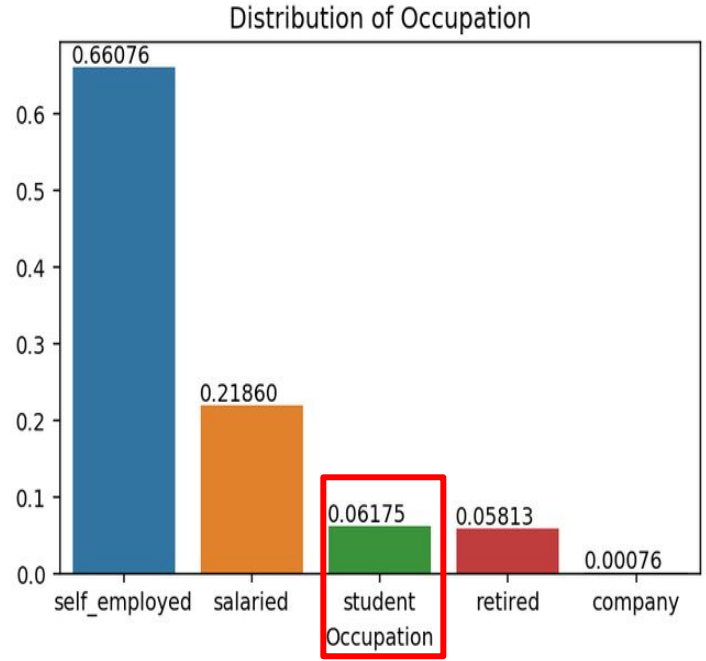

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Binomial Distribution

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$$P = \frac{n!}{x!\ (n-x)!}\ p^x\ (1-p)^{n-x}$$

n → # Trials

x → # Success

p → Probability of success

1-p → Probability of failure

Binomial Distribution

Ex. In 100 flips of coin, Probability of getting “exactly“ 52 heads?

Binomial Distribution

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$$\frac{100!}{52!\,(100-52)!}\left(\frac{1}{2}\right)^{52}\left(1-\frac{1}{2}\right)^{100-52} = 0.073$$

Binomial Distribution

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Binomial Distribution

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$$\sum_{i=52}^{i=100}\frac{100!}{i!\,(100-i)!}\left(\frac{1}{2}\right)^{i}\left(1-\frac{1}{2}\right)^{100-i} = 0.382$$

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Binomial Distribution

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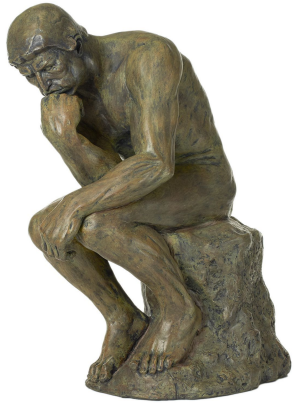
Ex. In 100 flips of coins, Probability of getting “at most“ 52 heads?

$$\sum_{i=0}^{i=52}\frac{100!}{i!\,(100-i)!}\left(\frac{1}{2}\right)^{i}\left(1-\frac{1}{2}\right)^{100-i} = 0.691$$

Binomial Distribution

Ex. In 100 Trials of selecting among Churning Customers Probability of getting 52 Male Churning Customers ?

Binomial ?



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Binomial Distribution

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Binomial ?
No

Hypergeometric Distribution
Changed Probability after each trial

Thank You!