# thompson_sampling

November 7, 2024

# 1 Thompson Sampling

## 1.1 Importing the libraries

```
[ ]: import numpy as np
     import matplotlib.pyplot as plt
     import pandas as pd
```

## 1.2 Importing the dataset

```
[ ]: dataset = pd.read_csv('Ads_CTR_Optimisation.csv')
```

## 1.3 Implementing Thompson Sampling

```
[ ]: import random
     N = 10000
     d = 10
     ads_selected = []
     numbers_of_rewards_1 = [0] * d
     numbers_of_rewards_0 = [0] * d
     total_reward = 0
     for n in range(0, N):
         ad = 0
         max_random = 0
         for i in range(0, d):
             random_beta = random.betavariate(numbers_of_rewards_1[i] + 1,␣
      ↪numbers_of_rewards_0[i] + 1)
             if random_beta > max_random:
                 max_random = random_beta
                 ad = i
         ads_selected.append(ad)
         reward = dataset.values[n, ad]
         if reward == 1:
             numbers_of_rewards_1[ad] = numbers_of_rewards_1[ad] + 1
         else:
             numbers_of_rewards_0[ad] = numbers_of_rewards_0[ad] + 1
         total_reward = total_reward + reward
```

## 1.4 Visualising the results - Histogram

```
[4]: plt.hist(ads_selected)
     plt.title('Histogram of ads selections')
     plt.xlabel('Ads')
     plt.ylabel('Number of times each ad was selected')
     plt.show()
```