HUMBER

AI for Business Decision Making

AIGC 5503

Case Study: ThompsonSampling

Maximize Revenues with Thompson Sampling

- Maximize revenues of Online Retail Business with Thompson Sampling algorithm

Description

- Maximize revenues by selecting the best strategy to convert users to the premium plan.
- Use Thompson sampling algorithm to identify the best strategy.
- The best strategy has the highest conversion rate.

Problem Statement

- Many business problems can benefit from this approach.
- Objective: Identify the best marketing campaign among several (9 strategies used, Strategy 0-8).
- Strategies have different features.
- Measure success by customer conversion.
- Best strategy: Generates maximum conversion to the premium plan.
- Common application: Advertising or Ads.

Approach

- Measure performance compared to random strategy.
- Random strategy: Randomly select and measure conversion.
- Thompson sampling: Quickly identify and exploit the best strategy.

Random Strategy

- Select a strategy randomly at each time step.
- Test outcome on customer (conversion or not).
- Increment success if conversion achieved.

Principles of Thompson Sampling Algorithm

- Expected return modeled by Beta distribution.
- Beta distribution parameters (alpha and beta) updated at every time step.
- Start with equal Beta distribution for all strategies (alpha and beta = 1).
- Select strategy with highest outcome and update parameters.