Financial Asset Recommendation

Comparing the Performance of collaborative filtering, contextual and non-contextual bandit algorithms

By: Bharat Khandelwal

AGENDA

INTRODUCTION

- A data-driven system that suggests optimal financial assets (e.g., stocks, funds, ETFs, bonds) for individual investors.
- The most common way of recommending a financial asset is through traditional risk-based portfolio allocation, where assets are suggested based on an investor's risk profile using rule-based or mean-variance (Markowitz) portfolio optimization methods.
- **Impact of FAR**:
  - Better Portfolio Performance
  - Customer Satisfaction
  - Minimizes emotional decision-making

Choose the best model for financial asset recommendation

Collaborative Filtering
Effective for interaction-based recommendation

VS

Multi Armed Bandit
Suitable for merit-based recommendation

CHALLENGES

- Market volatility makes asset returns highly unpredictable.

- Hard to get real-world data

- Investor preferences and risk profiles vary widely and change over time.

- Sparse or limited historical interaction data reduces recommendation accuracy.

- Different assets have different liquidity and risk characteristics, making comparison difficult.

- Feedback is delayed because true reward is known only after days/weeks.

Collaborative Filtering

Why Multi Armed Bandit

Contextual Multi Armed Bandit

DATASET

MAB Data STRUCTURE

EXPERIMENTAL SETUP

EVALUATION METRICS

- **Regret**: Regret tells you how much worse your algorithm performed compared to a perfect oracle that always picks the best asset

RESULTS

CONCLUSION

FEEDBACK!