LLM Agents Hackathon

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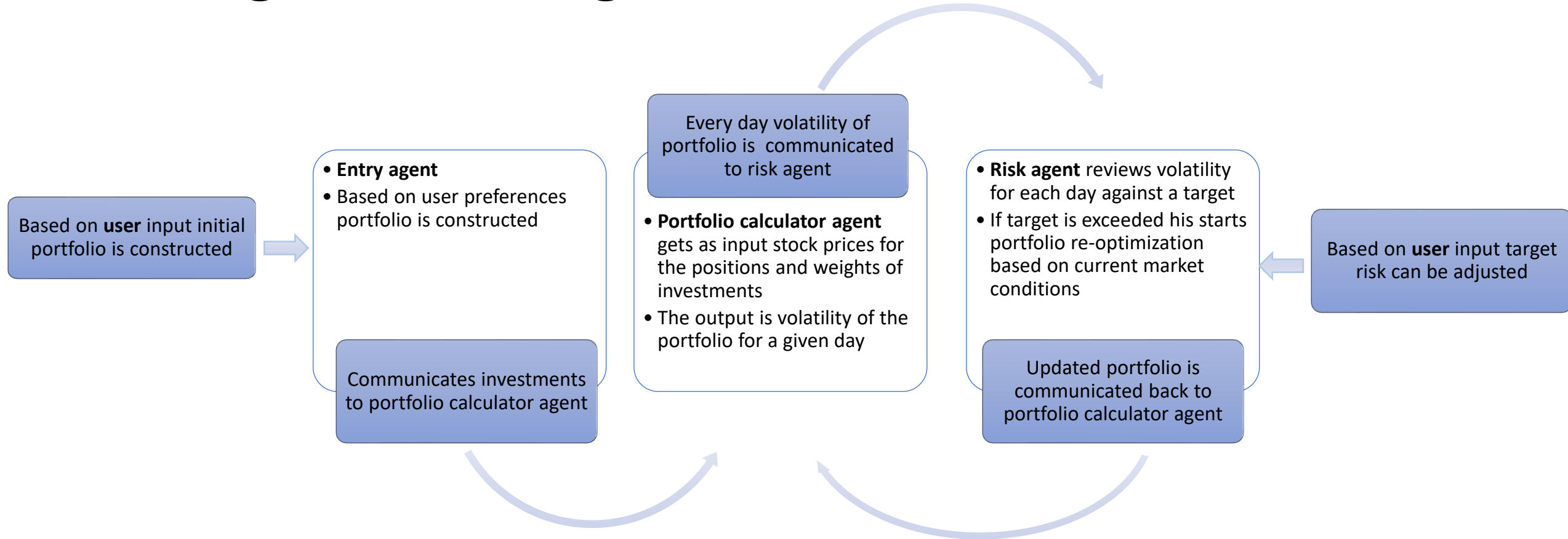
Introduction

- The projects is focused on creating investment portfolio based on user preferences and monitoring its risk over time and making adjustements based on risk preferences

- Managing portfolio is a complex task that has to factor in several parts. The main ones are:
  - Investor preferences and their changes
  - Risk appetite and changing market volatility
  - Adjustments to portfolio over time based on changes to preferences and market condition

Introduction

- Separate components naturally lead to agentic framework.
- In fact the independence of agents makes portfolio management robust. For example we want a risk manager to be independent from and inventor and objectively assessing risk of given trades
- Similarly we want agent that executes trades to be independent from investor and risk manager
- The agentic framework allows of future further development of subparts of the framework as they act independently

Design – Main Agents

Based on **user** input initial portfolio is constructed

- **Entry agent**
- Based on user preferences portfolio is constructed

Communicates investments to portfolio calculator agent

Every day volatility of portfolio is communicated to risk agent

- **Portfolio calculator agent** gets as input stock prices for the positions and weights of investments
- The output is volatility of the portfolio for a given day

- **Risk agent** reviews volatility for each day against a target
- If target is exceeded his starts portfolio re-optimization based on current market conditions

Updated portfolio is communicated back to portfolio calculator agent

Based on **user** input target risk can be adjusted

Design – Support Agents

- **Day Counter agent**
- Portfolio risk is calculated and rebalanced daily

Communicates day/date to other agents

Summary prepared by this agent allows user to make periodic portfolio adjustments

- **Summarizer agent**
- Every number of days agent summarizes portfolio risk for each date and rebalanced investment weights

Tools

- Agents to perform their tasks have several Tools at their disposal

- This approach limits performing tasks in a different way than intended

- For portfolio risk calculation we used function implementing Modern Portfolio Theory

- For covariance matrix estimation we use numpy cov() function

- For portfolio weights optimization with given volatility target we use SciPy optimize SLSQP method