Optimizing Trading Strategies with Reinforcement Learning

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Agenda

- Overview
- Updated Domain and architecture Models
- Deliverables
- Gantt Chart

Overview

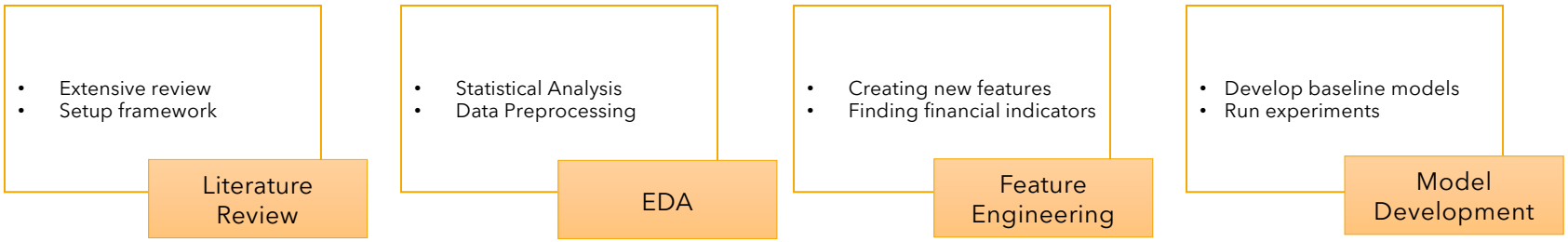
Proposed Project

- Develop an agent to learn trading strategies for the DJI stocks leveraging reinforcement learning.
- Create a system that can adapt to market changes and optimize strategic decisions in real time aiming to maximize returns.
- Evaluate trading strategy performances using metrics and choose which the model will use.

Optimizing + Reinforcement Learning

- What it is : RL + Trading Strategies
- Goals
  - Learning from the Stock Market
  - Trading Decisions
  - Increase Profitability

Approach – Semester 1



Approach – Semester 2

- Simulate trend following, momentum-based strategies.

Develop models

- Let Agent explore and learn in environments

RL integration

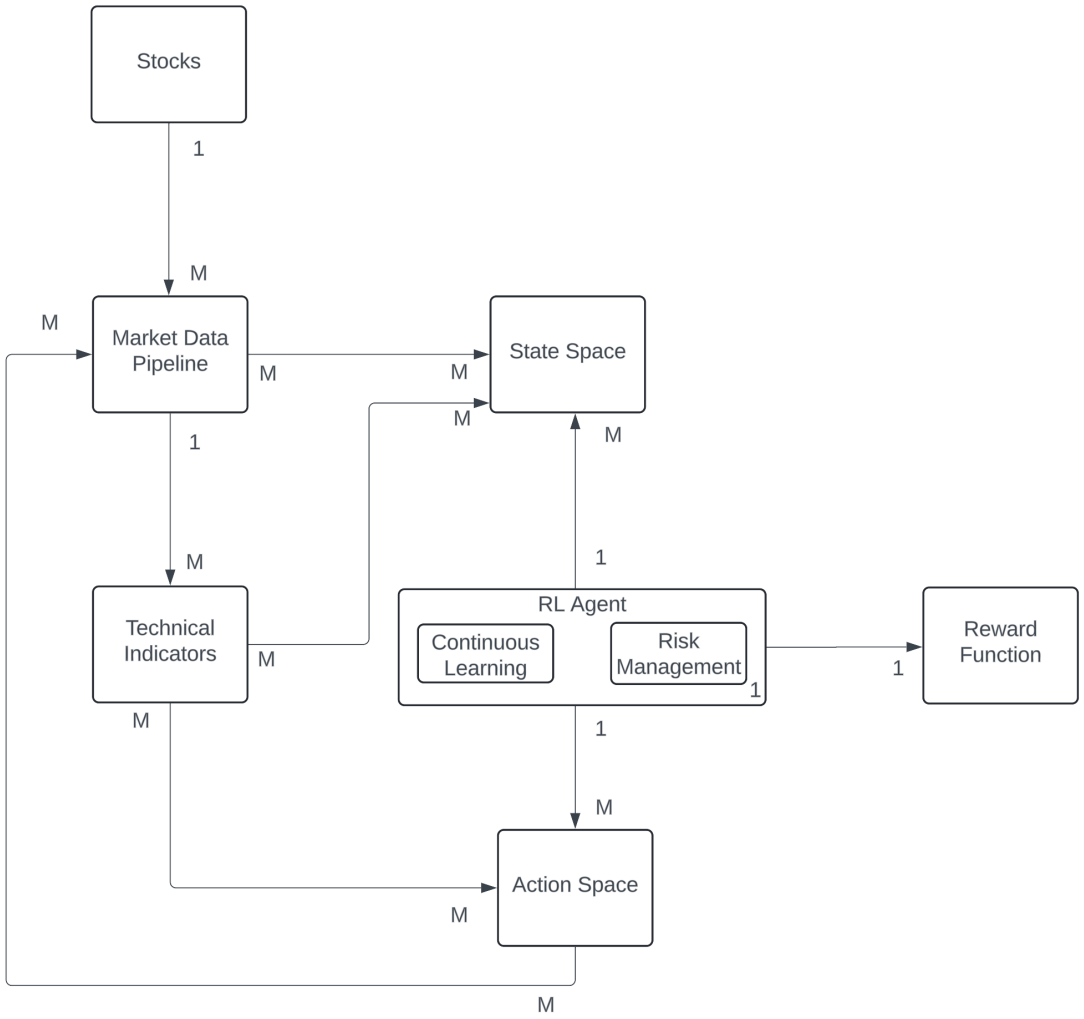
- Configure Database
- Develop UI

UI and Database

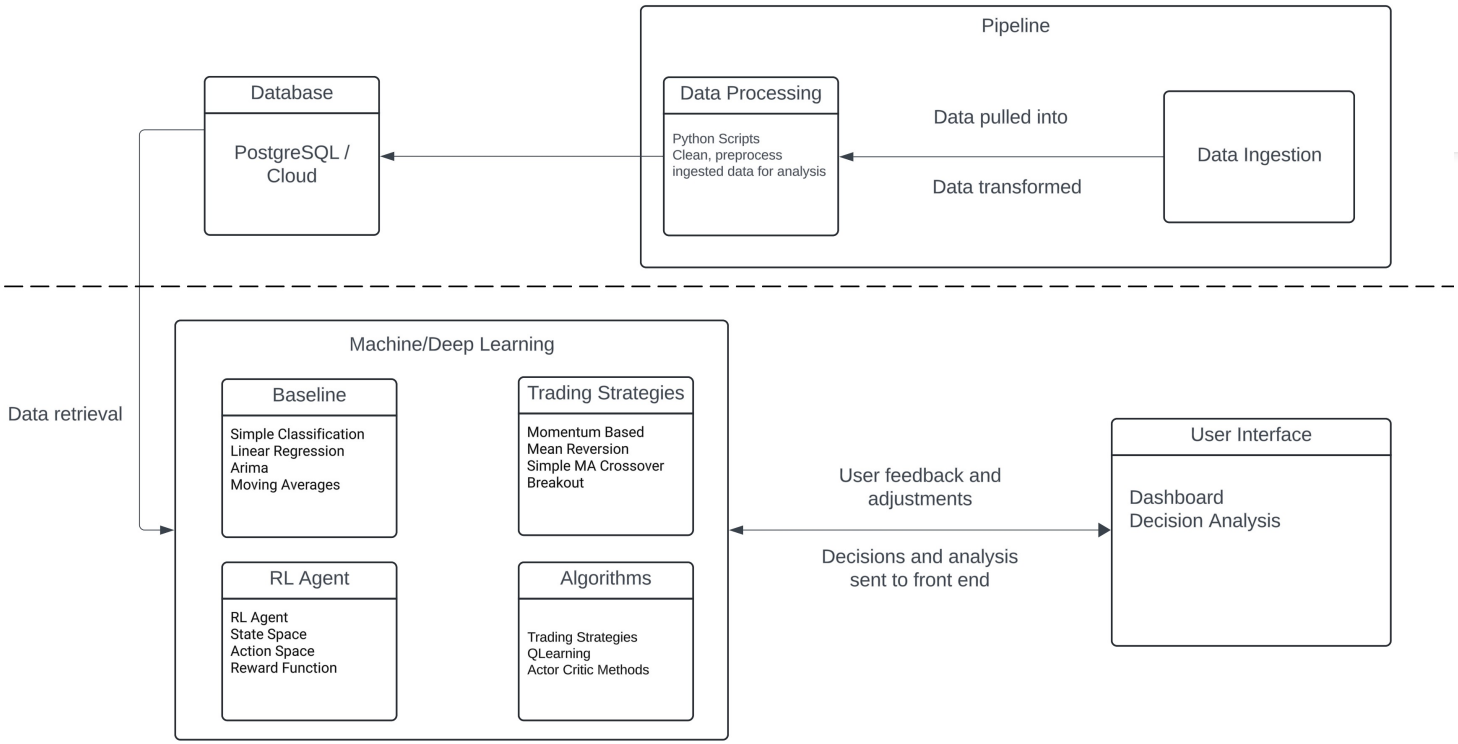
- Document process, results
- Present findings

Documentation

Domain Model


Stocks
1
M
M
Market Data Pipeline
M
M
State Space
M
M
1
M
1
M
Technical Indicators
M
RL Agent
Continuous Learning
Risk Management
1
1
Reward Function
1
M
Action Space
M
M

Architecture Model


Pipeline
Database
PostgreSQL / Cloud
Data Processing
Python Scripts
Clean, preprocess ingested data for analysis
Data pulled into
Data transformed
Data Ingestion
Machine/Deep Learning
Data retrieval
Baseline
Simple Classification
Linear Regression
Arima
Moving Averages
Trading Strategies
Momentum Based
Mean Reversion
Simple MA Crossover
Breakout
RL Agent
RL Agent
State Space
Action Space
Reward Function
Algorithms
Trading Strategies
QLearning
Actor Critic Methods
User feedback and adjustments
Decisions and analysis sent to front end
User Interface
Dashboard
Decision Analysis

Deliverables

- Trend strategy simulations [Started]
  - Momentum based
  - Mean Reversion
  - Simple MA Crossover
  - Breakout Strategies

Deliverables

- RL Agent and Integration [Started]
  - RL Environment Setup
  - Agent Selection and comparison
  - Training Agent and performance comparison
  - Basic Integration

Deliverables

- Develop Pipelines to automate processes
  - Data Cleaning Pipeline
  - Feature engineering Pipeline
  - Pipeline Orchestration
  - Testing and Validation

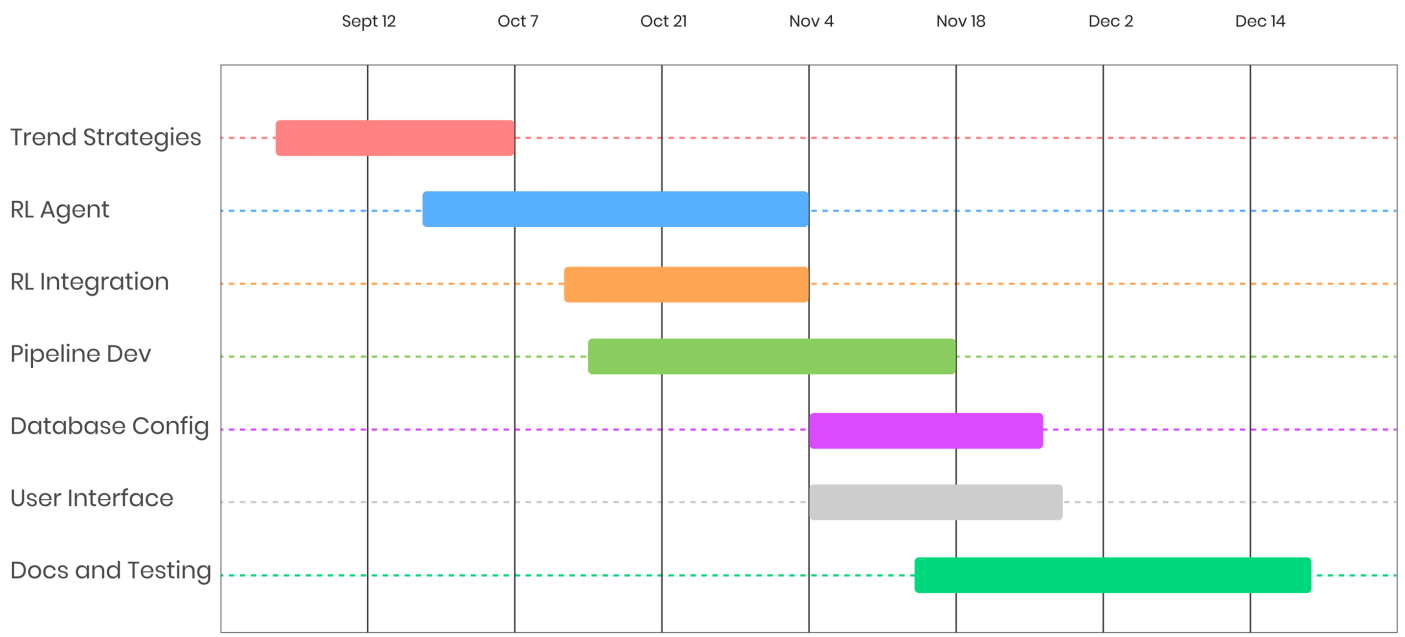
Deliverables

- Database Configuration
  - Schema Design
  - Setup
  - Integration with Pipelines

Deliverables

- User Interface
  - Basic Wireframe
  - UI Dev after finalizing framework
  - Reporting and exporting functionality

Gantt Chart


Sept 12
Oct 7
Oct 21
Nov 4
Nov 18
Dec 2
Dec 14
Trend Strategies
RL Agent
RL Integration
Pipeline Dev
Database Config
User Interface
Docs and Testing

Thank you