
# Financial analysis prototyping using AI & Python

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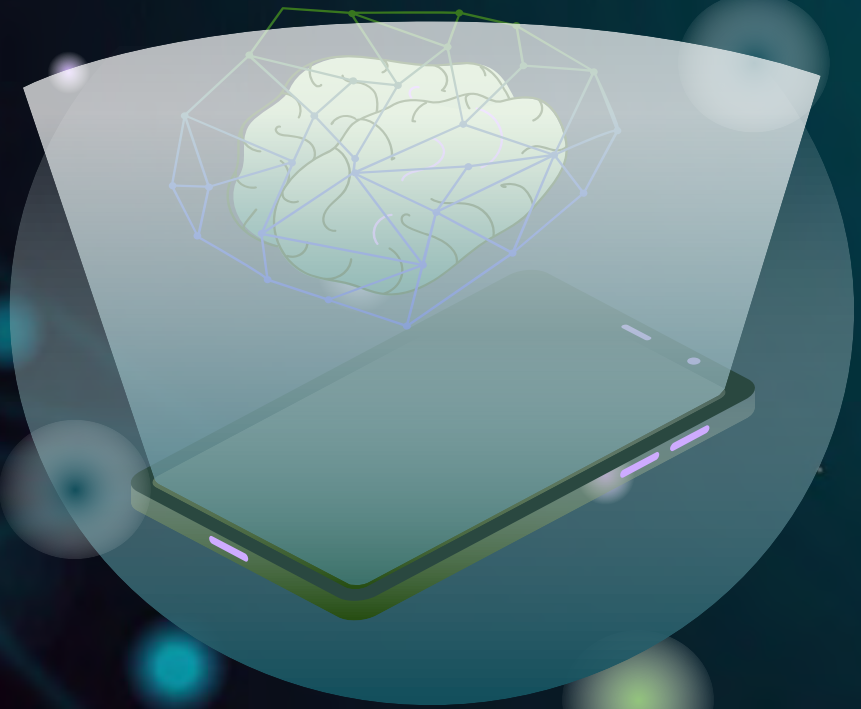

# Adopting & adapting AI in building Financial Applications

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# Focus on Skill Categories

# Evolution of Software Development: part I

**1950s-1970s**

Early Foundations

**1980s**

The Rise of Object-Oriented Programming

**1990s**

The Internet Revolution

## The Journey

of software development has been **remarkable.** We've progressed from the early days of **Assembly, Fortran, and COBOL to the era of AI-powered development.**

# Evolution of Software Development: part II

**2000s - 2010s**

Agile and the Cloud

**Late 2010s - 2020s**

Data and Machine Learning


**2020s & Beyond**

AI-Powered Development

## Results?

This reflects a continuous trend towards increased efficiency, automation, and the use of technology to solve complex problems and create innovative solutions.

# Applications of Time Series Analysis

- Algorithmic Trading & Risk Management
- Patient Monitoring & Epidemiology
- Predictive Maintenance & Quality Control
- Demand Forecasting & Inventory Management
- Energy Load Forecasting & Smart Grid Management
- Weather Forecasting & Climate Modeling
- Network Traffic Analysis & Fraud Detection
- Economic Forecasting & Public Health Monitoring

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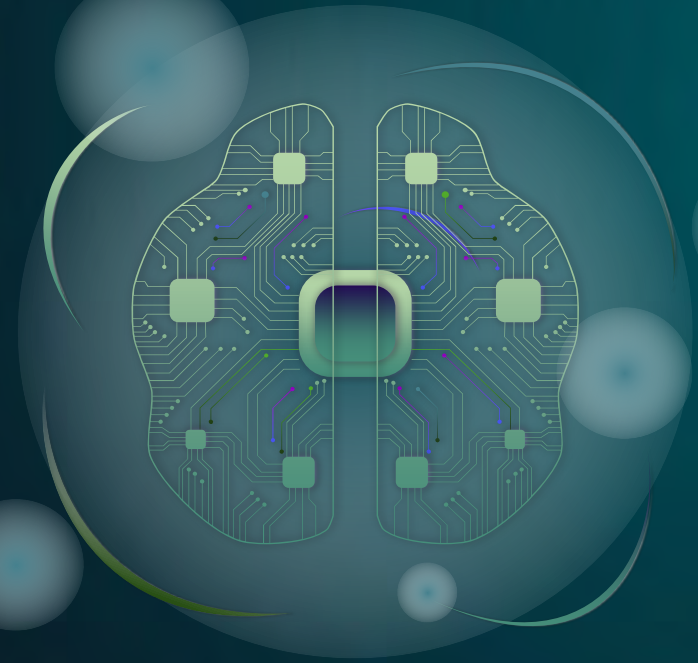

AI is expected to have a major impact on the global economy, with a potential

# 26% increase in global GDP by 2030

Source: Review of Artificial Intelligence in Education

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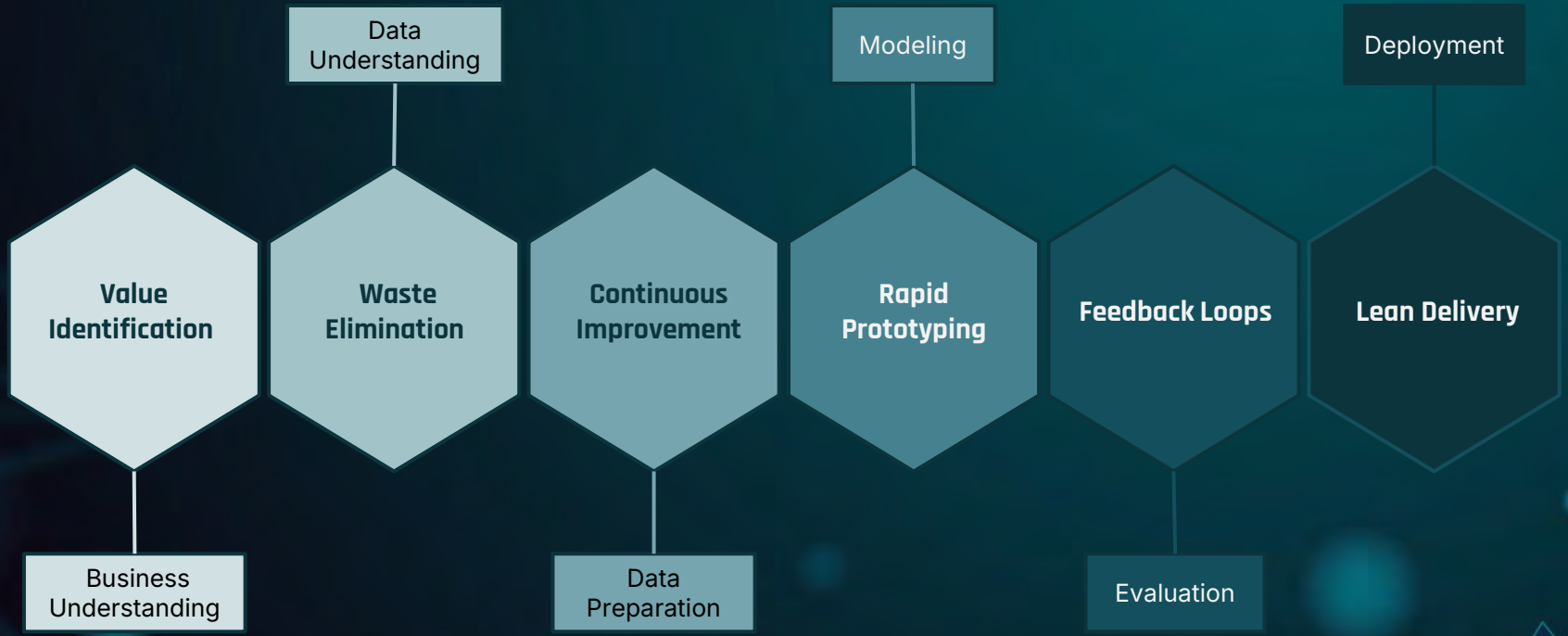
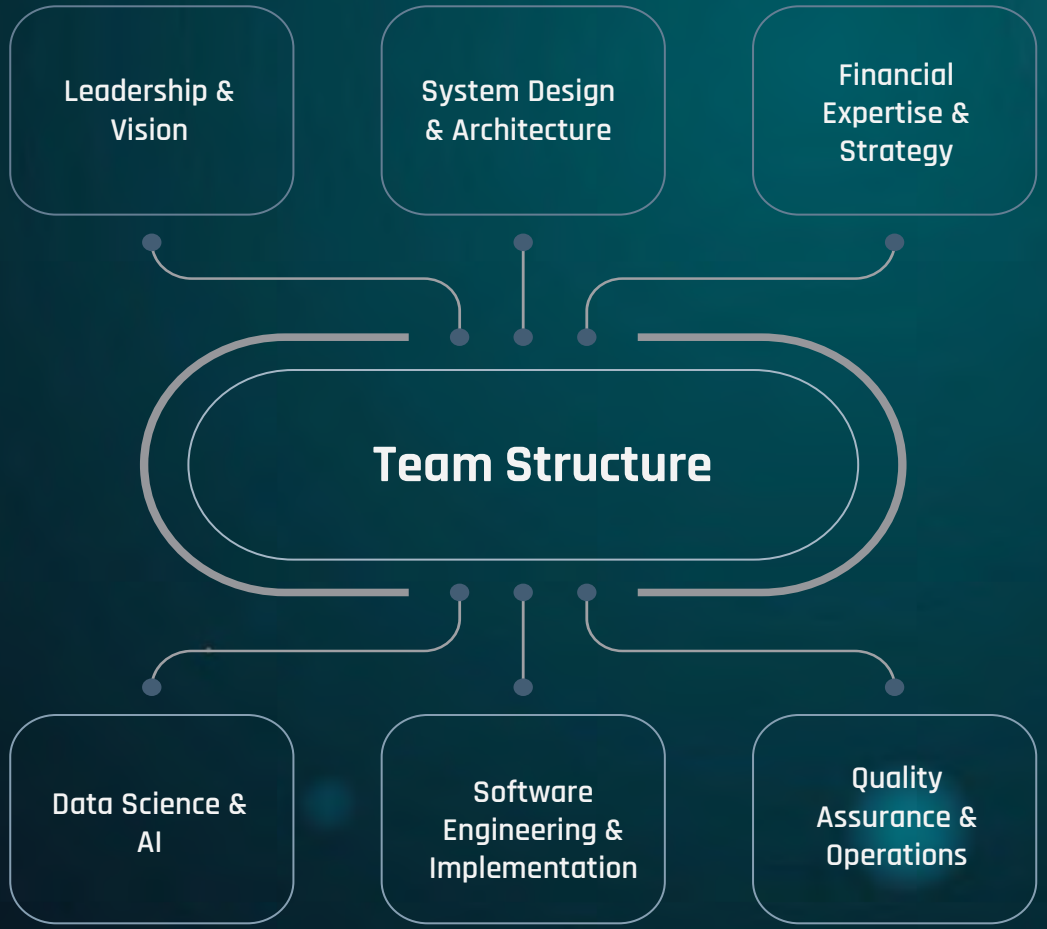
# Adopting the life cycles and methodologies



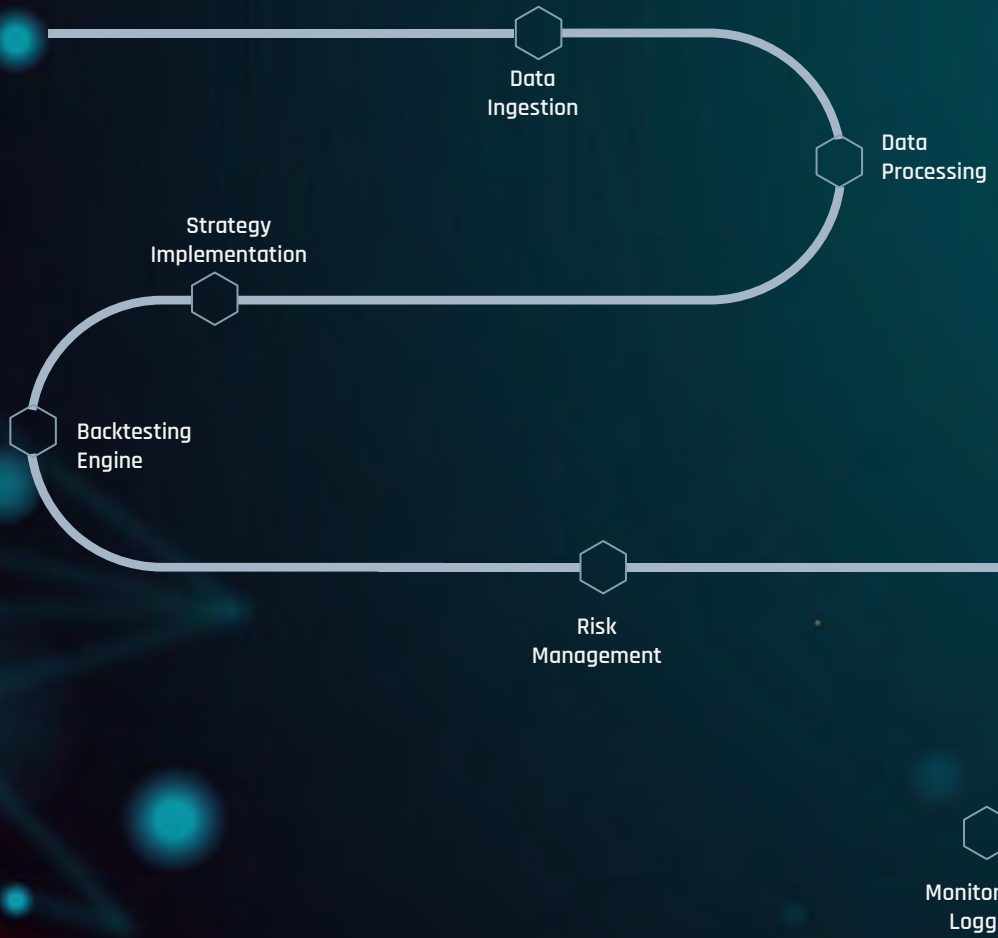

Mapping **CRISP-DM** onto **Lean Development**

A successful AI-driven financial analysis project requires a diverse team with specialized skills, including financial expertise, data science, software engineering, and risk management.



# A Phased, Lean Approach to AI-Driven Financial Analysis Prototyping

# Prototype Architecture

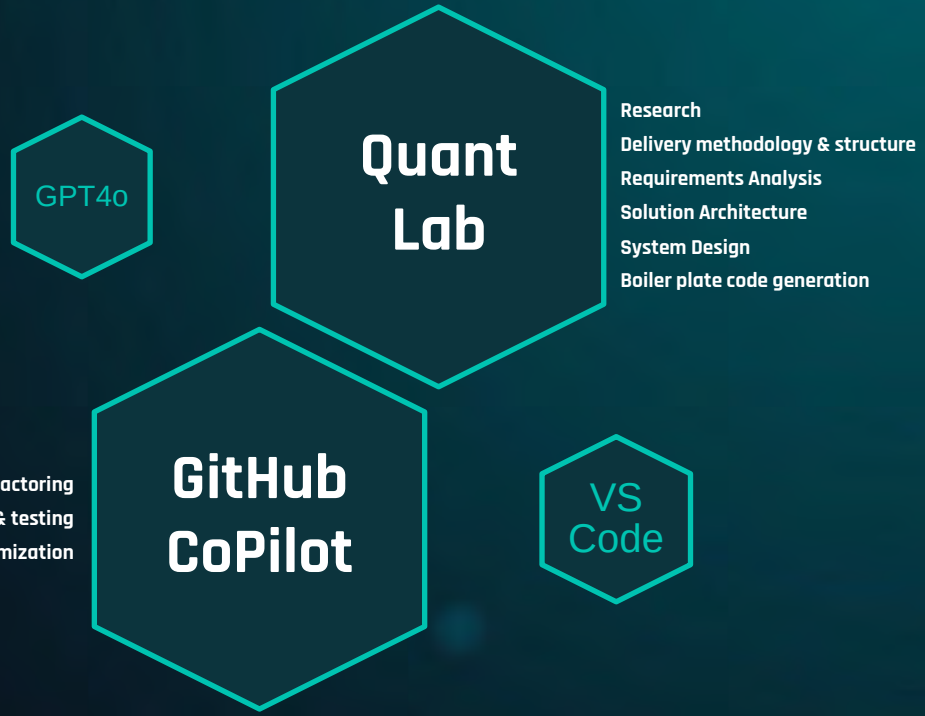



The process outlines the core components of a prototype system for financial analysis, highlighting the data flow, required resources, and expected outputs at each stage. The architecture emphasizes a streamlined approach for initial development and testing of algorithms.

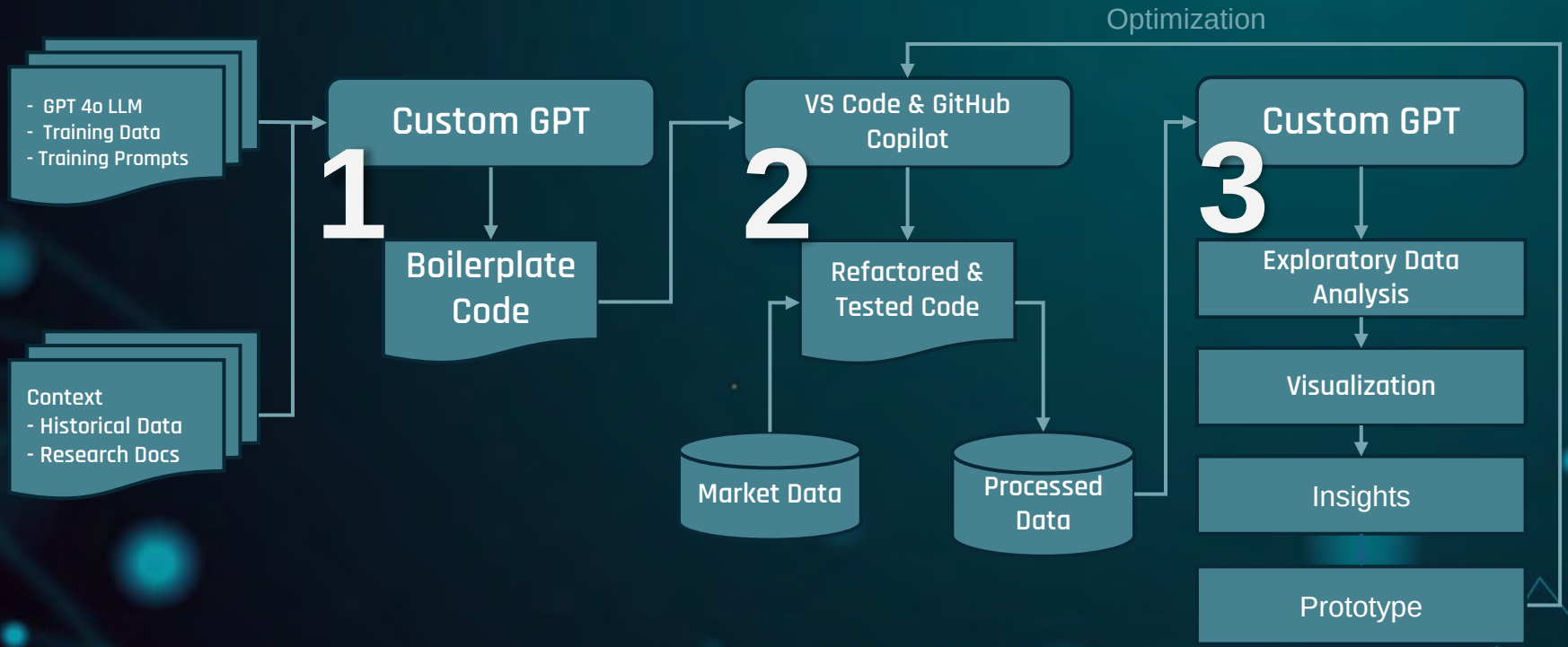
# System Architecture and Design Patterns

| Module | Key Functionality | Design Pattern |
|---|---|---|
| Data Ingestion | Fetch market data (historical and real-time) | Factory |
| Data Preprocessing | Clean, transform, and generate indicators | Decorator |
| Strategy Implementation | Implement and execute trading strategies | Strategy |
| Backtesting | Evaluate strategy performance | Template Method |
| Risk Management | Monitor risk and enforce limits | Observer |
| Trade Execution | Place and manage orders | Command |
| Optimization | Fine-tune strategy parameters | Singleton |
| Logging & Monitoring | Record trades, errors, and system events | Observer |

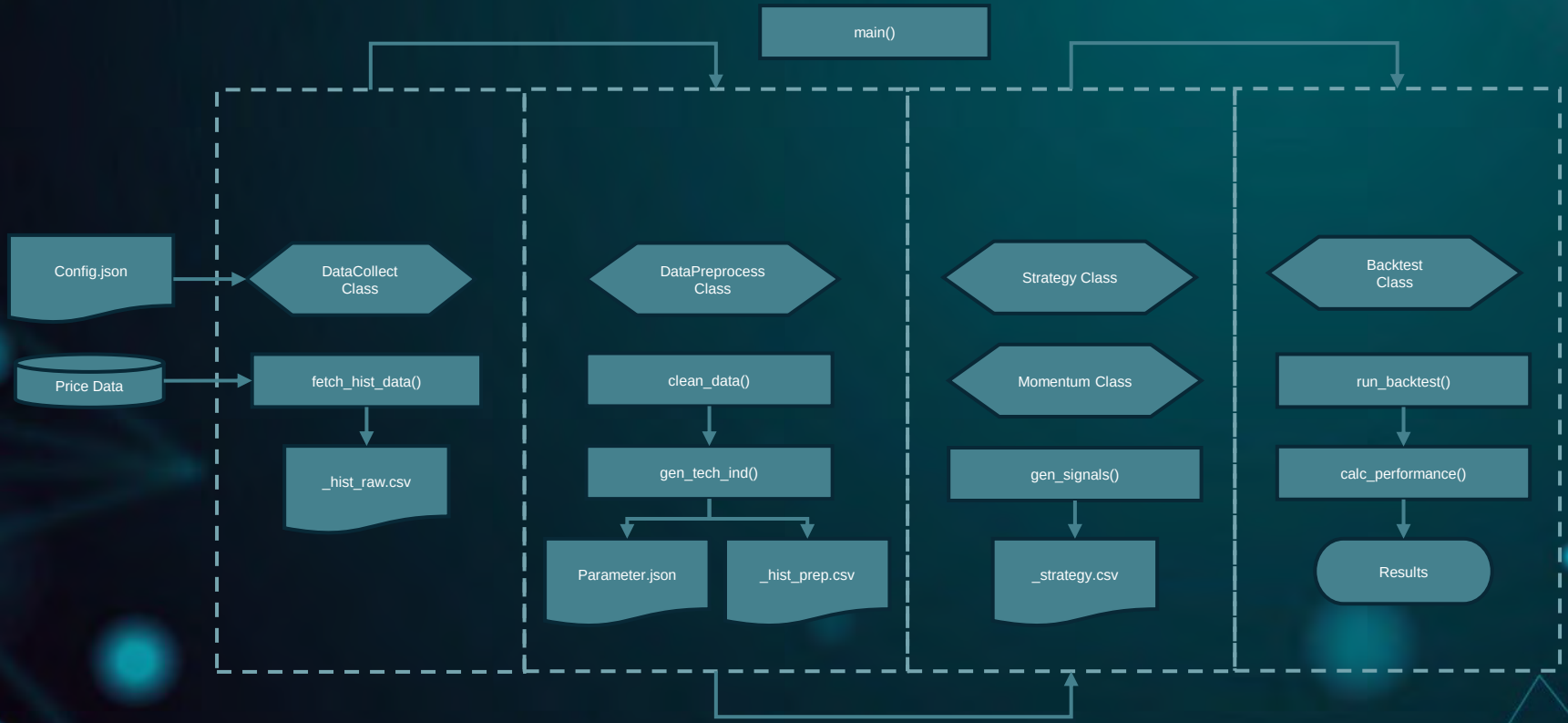
# How AI tools were used



# Approach


Optimization
- GPT 4o LLM
- Training Data
- Training Prompts
Context
- Historical Data
- Research Docs
Custom GPT
1
Boilerplate Code
VS Code & GitHub Copilot
2
Refactored & Tested Code
Market Data
Processed Data
Custom GPT
3
Exploratory Data Analysis
Visualization
Insights
Prototype

# SYSTEM ARCHITECTURE

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# Prerequisite – Tools & Input

- Pre trained Custom GPT – Quant Lab
  - https://chatgpt.com/share/66f57722-4888-8000-85c1-dd713d02e470
- Research Paper – Strategy context
  - https://pages.stern.nyu.edu/~lpederse/papers/TimeSeriesMomentum.pdf
- Starter Code from previous projects

# Walkthrough

## Quant Lab - GPT 4o

## VS Code - GitHub CoPilot

# Closing Thoughts

## Applications of Data Analytics & AI
## Trends & Future Direction

**Quant Lab**

https://chatgpt.com/share/66f57722-4888-8000-85c1-dd713d02e470

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