

RefactorAI

AI-based Refactoring of Legacy Systems for Digital Transformation Use Case – Support of Dependency Upgrade



Pro²Future

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MOTIVATION & GOALS

Modern software development **relies heavily on third-party libraries**, which provide reusable functionality and accelerate development cycles. However, as libraries evolve, **breaking changes** may disrupt client applications, causing compilation or runtime errors. Maintaining up-to-date dependencies requires developers to adapt their codebases to evolving libraries and their APIs. This **upgrade process**, particularly when dealing with breaking changes, is **tedious and time-consuming**. To this end, this work aims to investigate the **combination of Generative AI with traditional Software Engineering (SE)** to support the refactoring tasks associated with upgrading dependencies. More specifically, we present an **agentic architecture** that orchestrates **existing software engineering** tools to provide **end-to-end support for the dependency upgrade workflow**.

Project FactBox

Project Name RefactorAI
Project ID FFG 921370
Duration 36 Months

Area 2
Area Orchestration

Project Lead
DI Dr. Ouijdane Guiza

APPROACH

In the proposed architecture, the work is divided among **specialized agents** and **coordinated by a central orchestrator**. The orchestrator serves as the **system's control layer**, receiving user requests and coordinating specialized agents based on their predefined capabilities. Each agent, on the other hand, is **optimized for a specific task** and runs in its own context window with **access to specific tools** to help achieve its goal.

CONTRIBUTION

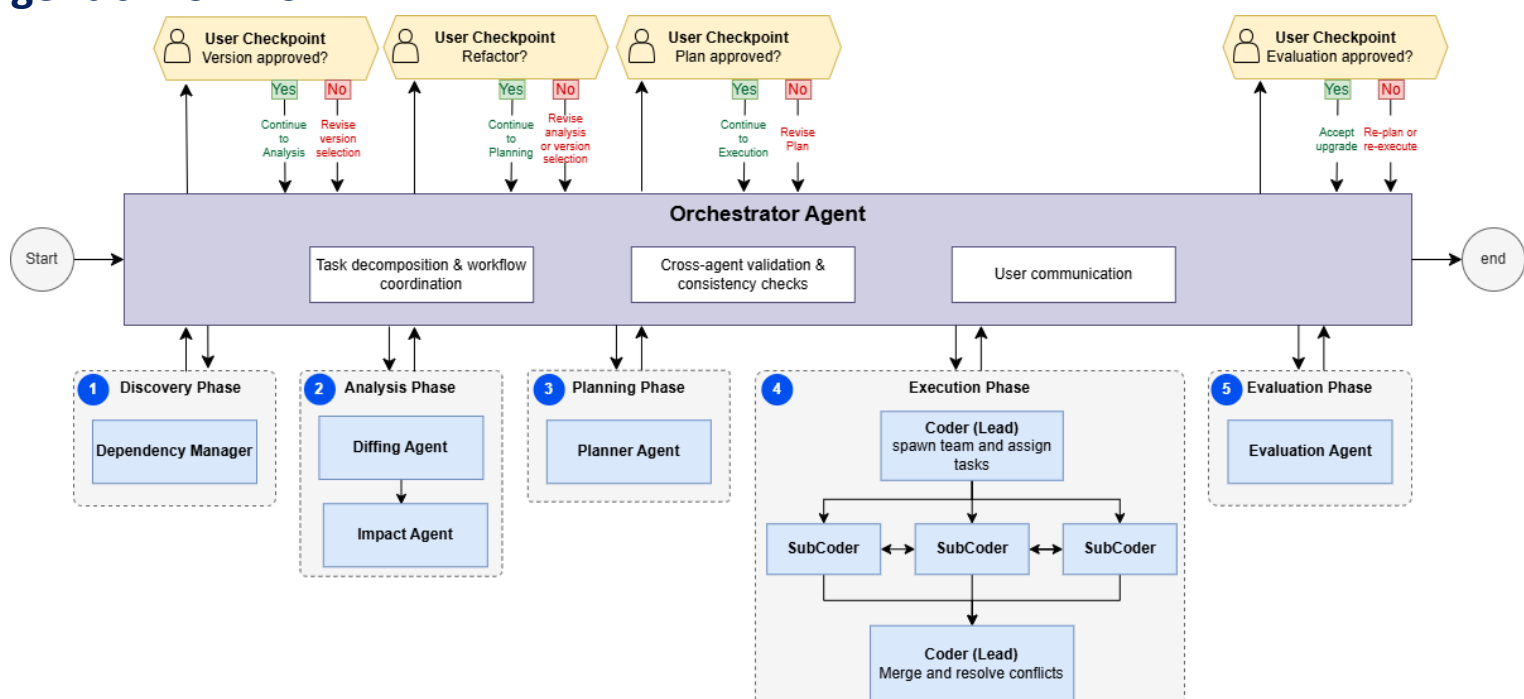
Scientific contribution

Identified key challenges in current dependency up-grade processes and in existing automation approaches, specifically AI-based tools. Proposed an agentic architecture that orchestrates existing software engineering tools to provide end-to-end support for the dependency upgrade workflow.

Economic contribution

Reduces dependency upgrade effort and maintenance costs. Shortens upgrade cycles and improves developer productivity.

Agentic Workflow



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