Enhancing Agile Workflows with AI-Driven, Sustainability-Aware Requirements Engineering: A Design Science Approach

About

This study introduces Reqwire, an AI-driven, multi-agent system designed to integrate sustainability into agile software development. The system automatically generates user stories from requirement documents, enriches them with sustainability attributes, and integrates with project management tools like Jira. The research follows a Design Science Research (DSR) approach, using iterative cycles of design and evaluation with feedback from industry and academic partners.

Problem

During the requirements engineering phase of software projects, sustainability is often not a primary consideration. As a result, software engineers typically lack the tools to assess the environmental, social, and economic impacts of their products, leading to a gap between development practices and sustainable outcomes. This study addresses the lack of systematic tools for incorporating sustainability directly into early-stage agile workflows.

Study Outcome

- Reqwire reduces manual effort by automatically generating structured user stories, estimating story points, and assigning sustainability tags.
- The system successfully categorizes sustainability impacts across five dimensions: environmental, economic, social, individual, and technical.
- Its multi-agent framework enables integration with third-party tools like Jira, supporting consistent and systematic project tracking.
- Initial tests indicate that Reqwire shows promise for enhancing agile workflows and promoting sustainable software development practices.

Keywords

Requirement Engineering • Agile Development • User Stories • Generative AI • AI Agents • Sustainability