

RepoPilot

An AI-assisted repository scanner for security, code quality, and onboarding documentation

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Executive Summary

RepoPilot is an AI-assisted repo scanner that analyzes GitHub repositories or ZIP uploads to produce structured insights, vulnerability reports, bug findings, and developer onboarding summaries, built for the IBM Bob Hackathon.

The Problem

Developers and support teams often struggle to quickly understand unfamiliar repositories, identify security risks, and generate useful onboarding documentation for new team members.

Key Features

- Automated README and onboarding documentation generation
- Security scanning via npm audit, semgrep, and gitleaks
- Code quality analysis via eslint, ruff, and custom pattern detection
- Multi-language support for Node.js and Python projects
- License compliance checking, dependency inventory, and test coverage evaluation
- ZIP upload support for local, proprietary codebases alongside GitHub repo scanning

Technology Stack

React	TypeScript	Vite	Express.js
Node.js	Tailwind CSS		

Architecture

RepoPilot is built as a React 18 + TypeScript + Vite frontend talking to a Node.js/Express + TypeScript backend, with a modular middleware/agents layer that orchestrates the analysis (security scanning, code quality checks, doc generation) with per-agent timeout handling. It clones or unpacks the target repository, runs it through eslint/ruff/semgrep/gitleaks/npm audit, and produces a structured Markdown report. It is deployable via Docker Compose or exposed publicly through Tailscale Funnel.

Security Considerations

Uses temporary, short-lived tokens for GitHub access. ZIP uploads are scanned and immediately discarded after processing to ensure proprietary code is never retained on the server.

Challenges & Engineering Decisions

Challenge Supporting both GitHub repository input and ZIP upload input cleanly.	Solution Built one analysis pipeline that accepts either a repo URL or an uploaded ZIP archive.
Challenge Handling private repository restrictions without confusing backend errors.	Solution Added clear, user-facing messaging when a repository is private or inaccessible.
Challenge Preventing sensitive files such as .env from ever being exposed.	Solution Added security-focused filtering to keep secrets out of generated reports.
Challenge Balancing AI-generated documentation quality with actionable, structured output.	Solution Combined AI summarization with deterministic scanners (semgrep, gitleaks, eslint, ruff).
Challenge Deploying securely on a self-hosted server.	Solution Hosted through a self-hosted setup using HTTPS and Tailscale Funnel.

Takeaway

RepoPilot combines AI, cybersecurity, documentation automation, testing, and secure deployment into one practical tool, emphasizing secure code review thinking and support-friendly reporting.

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