

# Innovation Challenge – AI Tool Proposal

**Tool Name:** CodeWhispererDoc

## **Purpose:**

Software engineers spend significant time writing and updating documentation — often under tight deadlines, which leads to outdated or missing docs. **CodeWhispererDoc** is an AI-powered tool that automatically **generates, updates, and summarizes documentation** for software projects using **codebase analysis, commit history, and natural language processing (NLP)**.

## **Key Features:**

- **Auto-Generate Docstrings:** Detects functions/classes without docstrings and generates clear, concise documentation.
- **Commit-Aware Updates:** Watches Git commits and suggests doc updates after code changes.
- **Codebase Summary:** Generates markdown or HTML summaries of large modules for onboarding and technical overviews.
- **Multilingual Support:** Translates documentation into multiple languages using NLP.
- **API Doc Syncing:** Integrates with Swagger/OpenAPI to sync internal docs with public API documentation.

## **Workflow:**

1. **Input:** Source code repo (Python, JavaScript, Java, etc.).
2. **Parsing Engine:** Static code analysis extracts function names, parameters, class hierarchies, and logic flow.
3. **NLP Layer:**
  - GPT-like transformer model summarizes logic into human-readable docstrings and markdown.
  - Tracks commit messages to determine what's changed.
4. **Output:**

- In-code docstrings.
  - Markdown/API documentation.
  - Suggestions panel in VS Code or GitHub UI.
5. **Optional Feedback Loop:** Accept or reject AI-suggested docs with a click to improve the model.

### Impact:

- **Time-saving:** Reduces hours of manual documentation work.
- **Consistency:** Ensures documentation is always in sync with code.
- **Better Onboarding:** Summarized code logic aids new developers in understanding complex codebases.
- **Improved Quality:** Well-documented code leads to fewer bugs and better collaboration.

### Target Users:

- Software teams (startups to enterprises)
- Open-source maintainers
- Technical writers
- DevOps & CI/CD engineers