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AI for Bharat Hackathon

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Team Name: CodeCraft Innovators

Team Leader Name: Jayanka J

Problem Statement: Build an AI-powered solution that helps people learn faster, work smarter, or become more productive while building or understanding technology

Brief about the Idea:

AI-learning-assistant is an intelligent coding companion that transforms how developers learn, debug, and build software. It combines real-time code analysis, contextual learning, and AI-powered assistance to accelerate developer productivity.

Key Innovation: Unlike generic AI assistants, AI-learning-assistant understands your entire codebase context, learning patterns, and provides personalized explanations tailored to your skill level. It actively tracks your growth and adapts its teaching style.

Target Users: Students learning to code, junior developers ramping up, and experienced engineers exploring new technologies or debugging complex systems.

SOLUTION :

- **Context-Aware Intelligence:** Unlike ChatGPT or GitHub Copilot that provide generic responses, AI-learning-assistant analyzes your entire project structure, coding patterns, and previously written code to deliver contextual suggestions that fit YOUR codebase architecture and style.
- **Personalized Learning Paths:** Creates adaptive skill progression based on your knowledge gaps, learning speed, and goals. Explains concepts at your level (beginner, intermediate, expert) and tracks progress over time with visual skill trees.
- **Interactive Code Walkthroughs:** Provides step-by-step explanations of complex code with visual call stack traces, variable state tracking, and “explain like I’m 5” mode. Debugs with you in real-time, not just suggesting fixes but teaching WHY errors happen.

List of features offered by the solution

Smart Code Assistant: Real-time code suggestions, autocomplete with explanations, refactoring recommendations with before/after comparisons.

Intelligent Debugger: Identifies bugs with root cause analysis, suggests fixes with explanations, visual execution flow tracking.

Concept Explorer: Interactive tutorials for algorithms, data structures, design patterns with visual animations and practice problems.

Documentation Navigator: Searches libraries, APIs, frameworks with contextual examples relevant to your current work.

Progress Tracker: Skill tree visualization, achievement badges, personalized learning recommendations based on gaps.

Code Review Assistant: Analyzes code quality, security vulnerabilities, performance bottlenecks with actionable improvement suggestions.

Process flow diagram or Use-case diagram

Add a flow diagram or a use case diagram or an architecture diagram.

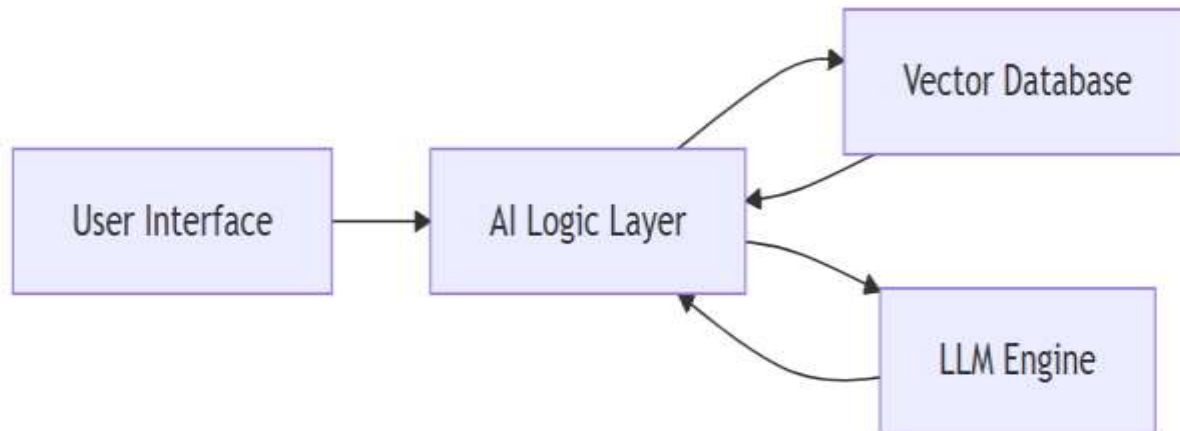
User Journey Flow:

1. Developer writes code in IDE → 2. AI analyzes code context → 3. System detects issues/opportunities → 4. Provides personalized suggestions → 5. Developer interacts and learns → 6. Progress tracked and synced → 7. Adaptive learning path updates

Key System Components:

• IDE Integration Layer (VS Code, IntelliJ, PyCharm) • Context Analysis Engine (codebase parsing) • AI Reasoning Core (AWS Bedrock with Claude) • Learning Path Manager (skill tracking) • Knowledge Base (indexed documentation)

Architecture diagram of the proposed solution:



Technologies to be used in the solution:

AI & ML: AWS Bedrock with Anthropic Claude Sonnet 4.5 • Amazon OpenSearch for vector embeddings • Custom fine-tuning datasets

Backend: AWS Lambda • API Gateway • DynamoDB • S3 • ElastiCache (Redis)

Frontend: VS Code/IntelliJ/PyCharm Extension APIs • React + TypeScript • React Native • TailwindCSS

Code Analysis: Tree-sitter parsers • Language-specific AST tools (Babel, Roslyn) • Static analysis (ESLint, Pylint)

DevOps: AWS CloudFormation (IaC) • CloudWatch • CodePipeline • Docker

Estimated implementation cost (optional):

Development Phase (6 months): Team (4 engineers, 1 designer, 1 PM) = \$180,000 •

AWS Dev Credits: \$5,000 • Tools/licenses: \$3,000 → Total: \$188,000

Monthly Infrastructure: Bedrock API: ~\$2,000 • Lambda/API Gateway/DynamoDB:

~\$500 • OpenSearch: ~\$800 • S3/Monitoring: ~\$300 → Monthly: \$3,600 (Annual: \$43,200)

First Year Total: ~\$231,000

Revenue Model: Freemium (basic features free) • Individual: \$15/month • Team:

\$25/user/month • Enterprise: Custom pricing → Break-even at ~700 users

Impact & Future Vision

Measurable Outcomes: 40% reduction in debugging time • 60% faster learning for new tech • 30% improvement in code quality • 10+ hours saved per developer weekly

Social Impact for Bharat: Democratize coding education with multilingual support • Enable self-paced learning in tier 2/3 cities • Support career transitions into tech • Bridge skill gaps in AI, cloud, emerging tech

Scalability Plan: Support 20+ programming languages • Integrate with learning platforms (Udemy, Coursera) • Community knowledge base • Offline mode for limited connectivity areas

AWS Alignment: Leverages AWS Bedrock for responsible AI • Demonstrates serverless best practices • Showcases AWS AI/ML capabilities • Built for Indian market with global scalability

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Thank You

