**(AnnexureB)**

## INTEGRATED PROJECT REPORT

**On**

# Dev Insights

Submitted in partial fulfillment of the requirement for the Course Integrated Project (CS 203) of

**COMPUTER SCIENCE AND ENGINEERING**

### B.E. Batch-2022 (VI Semester)



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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

# CHITKARA UNIVERSITY

**PUNJAB**

## CERTIFICATE

This is to be certified that the project entitled “Dev Insights” has been submitted for the Bachelor of Computer Science Engineering at Chitkara University, Punjab during the academic semester January 2025-May-2025 is a bonafide piece of project work carried out by “Sanskriti (2210992252), Sanya (2210992255),Ishaan Singla (2210992582), Nutan (221099)” towards the partial fulfillment for the award of the course Integrated Project (CS 203) under the guidance of “Dr. Lekha Rani” and supervision.

**Sign. of Project Guide**

Dev Insights

Dr. Lekha Rani

## CANDIDATE’SDECLARATION

We, **“Sanskriti (2210992252), Sanya (2210992255), Ishaan Singla (2210992582), Nutan(221099)”,** B.E.-2022 of the Chitkara University, Punjab hereby declare that the Integrated Project Report entitled **“Dev Insights”** is an original work and data provided in the study is authentic to the best of our knowledge. This report has not been submitted to any other Institute for the award of any other course.

| **Sign.of Student1** | **Sign.of Student2** | **Sign.of Student3** | **Sign.of Student4** |
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**Place: Rajpura**

**Date: 3-03-2025**

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**1. Abstract/Keywords**  
DevInsights is an AI-powered web application designed to assist developers in understanding and managing code changes in large repositories efficiently. The system provides AI-generated commit summaries and enables natural language-based code search, significantly reducing the time spent on manual review and code navigation. This project enhances productivity by integrating AI-driven insights, seamless repository management, and intuitive user authentication.

**Keywords:**  
AI-Powered Code Insights, Commit Summarization, Natural Language Code Search, Repository Management, Next.js, Google Gemini AI, GitHub API, Clerk Authentication, Neon PostgreSQL, Bun, Vercel Deployment.

**2. Introduction to the Project**

Traditional code review and repository navigation require extensive manual effort, making it difficult for developers to track changes efficiently. DevInsights solves this problem by providing AI-generated commit summaries and enabling natural language-based code search, allowing developers to quickly understand code modifications and locate specific functionalities without manually sifting through large repositories.

**2.1 Background**

With the rapid growth of software development, managing repositories efficiently has become crucial. Developers often rely on commit messages and manual code reviews, which can be time-consuming and error-prone. Existing tools offer limited AI-driven insights. DevInsights leverages Next.js, AI models like Google Gemini, and GitHub API to streamline repository management and enhance productivity

**2.2 Problem Statement**

The major issues in the current market include:

* **Time-consuming code reviews:** Manually reviewing commit messages and searching through code is inefficient.
* **Lack of intelligent insights:** Existing tools do not provide AI-powered commit summarization.
* **Complex repository navigation:** Developers struggle to locate specific code changes.
* **Inefficient onboarding:** New team members face difficulties understanding project history.

**3. Software and Hardware Requirement Specification**

**3.1 Methods**

DevInsights follows an Agile development approach, allowing continuous feedback and iterative improvements. The system is developed using modern web technologies and AI integrations.

**3.2 Programming/Working Environment**

The Dev Insights is developed using:

* **Frontend Technologies:** Next.js, React.js, TypeScript, ShadCN UI
* **Backend Technologies:** Node.js, Bun (for optimized performance)
* **Database Management:** Neon PostgreSQL
* **API Integrations:** Google Gemini AI, GitHub API, Clerk Authentication
* **Hosting & Deployment:** Vercel

**3.3 Requirements to Run the Application**

* Hardware Requirements:
* Processor: Intel i5 or higher
* RAM: Minimum 4GB (Recommended: 8GB)
* Storage: Minimum 20GB free space
* Display: Minimum 1024x768 resolution
* Software Requirements:
* Operating System: Windows, Linux, or macOS
* Development Tools: Visual Studio Code, Node.js, Bun
* Database: Neon PostgreSQL
* Browser: Google Chrome, Firefox, or Edge

**4. Database Analyzing, Design, and Implementation**

The database is structured using PostgreSQL (Neon Console) to ensure scalability and efficiency.

**Database Design:**

* Users Table: Stores developer profiles and authentication details.
* Repositories Table: Stores linked repositories and metadata.
* Commits Table: Stores commit histories and AI-generated summaries.
* Search Logs Table: Tracks user queries and search interactions

**Normalization:**

The database is optimized to Third Normal Form (3NF) to eliminate redundancy and enhance performance.

**5. Program’s Structure Analyzing and GUI Constructing**

**5.1 High-Level Design:**

* Flowchart & Use Case Diagram: Shows user interactions with the system.
* Architecture Diagram: Explains system components (frontend, backend, database).

**5.2 GUI Screenshots:**

* Login & Authentication Page: Users can sign in using Clerk authentication.
* Dashboard: Displays repository insights and AI-powered commit summaries.
* Code Search Interface: Enables natural language-based search for code snippets.
* Repository Management Panel: Allows developers to link and manage repositories.

**6. Code Implementation and Database Connections**

* Frontend Code: Next.js components for UI elements and API interactions.
* Backend Code: Node.js API endpoints handling commit summaries and search queries.
* Database Connection: PostgreSQL queries using Neon Console for efficient data retrieval.

**7. System Testing**

Types of Testing Performed:

* Unit Testing: Verifies individual components and API endpoints.
* Integration Testing: Ensures seamless interaction between frontend, backend, and database.
* User Acceptance Testing (UAT): Ensures the application is intuitive and user-friendly.
* Performance Testing: Measures response times and server load efficiency using Bun.

**8. Limitations**

Some limitations of the Dev Insights include:

AI Accuracy Constraints: AI-generated summaries may not always be perfect.

API Rate Limits: Dependency on GitHub API may cause restrictions.

Internet Dependency: Requires an active connection for full functionality.

**9. Conclusion**

DevInsights provides a cutting-edge solution for developers to manage and understand code changes efficiently. By leveraging AI for commit summarization and natural language code search, it enhances productivity and streamlines repository navigation.

**10. Future Scope**

Several upgrades and improvements can be made in the future, such as:

* Enhanced AI Training: Improve AI models for more precise commit summaries.
* Offline Functionality: Develop local repository analysis for offline use.
* Collaboration Tools: Implement team-based insights and discussion forums.
* Expanded Language Support: Support additional programming languages for code search.

**11. Bibliography/References**

Include references to books, research papers, websites, and online tutorials used during project development. Example:

* Next.js Documentation – <https://nextjs.org/docs>
* Google Gemini AI - <https://ai.google.dev/gemini-api/docs>
* GitHub API Documentation - <https://docs.github.com/en/rest>
* Vercel Documentation - <https://vercel.com/docs>
* Neon PostgreSQL - <https://neon.tech/docs/reference/api-reference>
* Clerk Authentication - <https://clerk.com/docs/quickstarts/nextjs>
* ShadCN UI - <https://ui.shadcn.com/docs>