**C&D Assist - AI-Powered Bug Detection & Fixing**

Presented by :  
Yuvanraj , Vijay, Athul Raj

Mentor :  
Ms. Anu Priya A., Assistant Professor (Sr.G)

Institution :  
KIT - Kalaignarkarunanidhi Institute of Technology

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# Introduction

C&D Assist is a lightweight AI tool designed to perform automated bug detection and fixing, optimized for systems with limited hardware resources. It aims to provide real-time assistance to developers by integrating a custom-built web-based Integrated Development Environment (IDE) for a seamless debugging experience.

# Platform Overview

The platform offers a user-friendly interface where developers can input raw code through a browser-based IDE. Upon submission, the system automatically detects bugs and suggests corrected code. Users can view error outputs, compare fixed code, and make corrections directly within the IDE. Additionally, the platform supports uploading Python files, language selection, and custom prompts to control bug-fixing behavior.

# 3. Key Features

* Real-time Bug Detection
* AI-Powered Bug Fixing
* Integrated Web-Based IDE
* Support for Python
* Customizable Prompts

# 4. AI Model Analysis

The backend interacts with transformer-based models to analyze and correct code. Specifically, the system leverages models from Stability AI for both bug detection and fixing. These models are designed to operate efficiently on systems with limited hardware resources, ensuring accessibility and usability across various environments.

# 5. System Implementation

Frontend:

* Technologies Used: HTML, CSS, JavaScript, PHP.
* Code Editor: Integrated with ACE Code Editor to provide a professional IDE feel.
* User Interface: Facilitates real-time input, output, and error visualization.

Backend:

* Language: Python.
* Functionality: Communicates with AI models to process code inputs, detect bugs, and generate corrected code outputs.

System Flow:

1. Code Input: User inputs code through the web-based IDE.

2. Bug Detection: The system analyzes the code using AI models to identify potential errors.

3. Bug Fixing: Upon detection, the system suggests corrections for the identified bugs.

4. Output Display: Corrected code and error explanations are presented to the user within the IDE.

5. User Interaction: The user can review, edit, and implement the suggested corrections.

# 6. Analysis and Findings

The current implementation demonstrates the feasibility of integrating AI models for real-time bug detection and fixing within a lightweight, web-based IDE. Preliminary tests indicate that the system effectively identifies common coding errors and provides relevant corrections. However, comprehensive evaluations are necessary to quantify accuracy, performance, and user satisfaction.

# 7. Conclusion and Recommendations

Conclusion:

C&D Assist showcases the potential of AI-powered tools in enhancing the coding and debugging process, especially for developers operating on systems with limited resources. Its integrated approach offers a streamlined experience, reducing the time and effort required for manual debugging.

Recommendations for Future Enhancements:

* Multi-Language Support
* Enhanced AI Models
* User Feedback Integration
* Performance Optimization

# 8. References

* Stability AI Models: https://stability.ai/
* ACE Code Editor: https://ace.c9.io/