CODEGENIE: Voice and Image Driven Automated Software Development Assistant

Esakkiammal. S

M.Tech (Information Technology)

PSN College of Engineering and Technology, Melathediyur, Tamil Nadu, India

Abstract—**Artificial Intelligence is playing an important role in modern software development. Developers often require assistance to generate code and understand programming concepts. This paper presents CodeGenie, a voice and image driven automated software development assistant that helps users generate programming code using natural language input.**
The system integrates Google Gemini API to process user queries and generate appropriate code responses. Users can provide input through text, voice commands, or images, making the system more flexible and user-friendly. The backend is developed using Python and Flask, which manages communication between the user interface and the AI model. The proposed system helps developers and students by providing quick coding support and improving productivity.

Index Terms—**Artificial Intelligence, Code Generation, Voice Input, Image Processing, Gemini API, Software Development Assistant**

I. INTRODUCTION

Software development requires strong programming knowledge and problem-solving skills. Many beginners face difficulties in writing code and understanding programming concepts. Artificial Intelligence based tools can help developers by generating code and explaining programming logic.

The proposed system CodeGenie is a voice and image driven automated software development assistant. The system allows users to provide queries using voice commands, images, or text input. The system processes the input using AI technology and generates programming code solutions.

By integrating Google Gemini API, the system provides intelligent responses and coding suggestions. This system helps students, developers, and beginners to generate code quickly and understand programming concepts more easily.

II. RELATED WORK

Several AI based coding assistants have been developed to support programmers in writing code efficiently. These tools use natural language processing and machine learning techniques to generate code based on user queries.

However, many existing systems focus only on text-based input. The proposed CodeGenie system improves usability by supporting voice input and image-based queries, making it easier for users to interact with the system.

III. SYSTEM ARCHITECTURE

The CodeGenie system consists of the following components:

1. User Interface – Allows users to enter queries through text, voice, or images.
2. Voice Processing Module – Converts voice commands into text format.
3. Image Processing Module – Extracts information from images provided by the user.
4. Backend Server – Developed using Flask to manage system operations.
5. AI Processing Module – Uses Google Gemini API to generate code responses.
6. Output Module – Displays the generated code and explanations to the user.
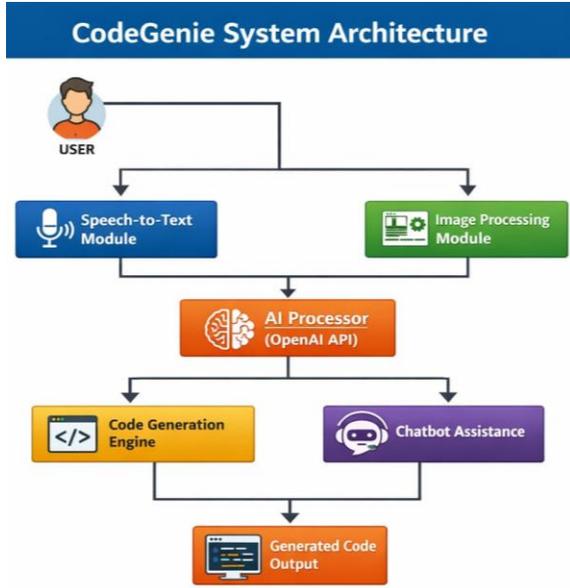
The user query is processed by the backend server and forwarded to the Gemini AI API, which generates the code response and returns it to the user.

SYSTEM FLOWCHART
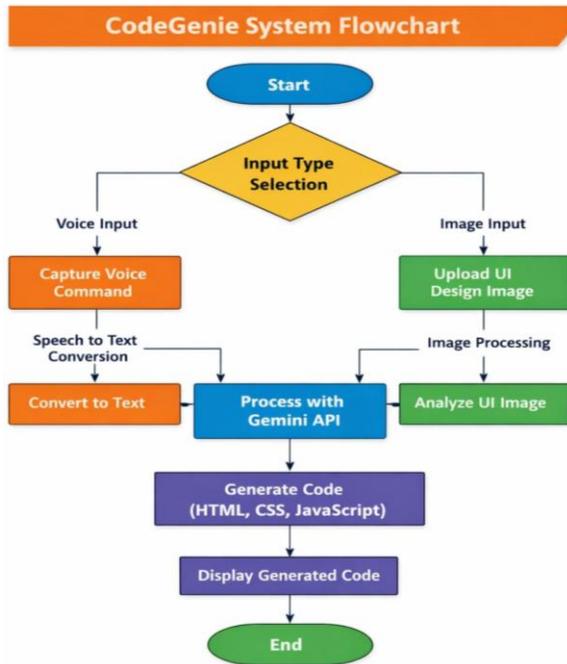
IV. IMPLEMENTATION

The system is implemented using the following technologies:

- Programming Language: Python
- Framework: Flask
- AI Integration: Google Gemini API
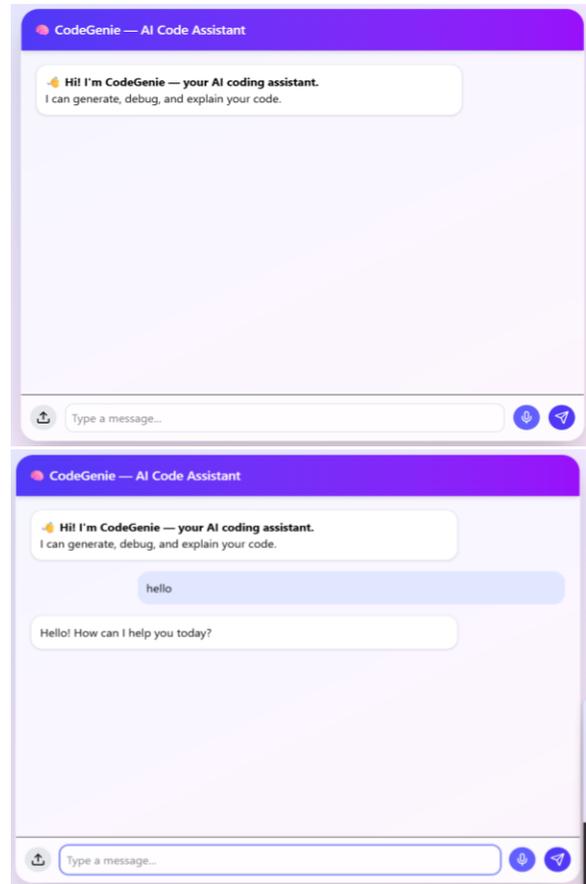- Frontend: HTML, CSS, JavaScript
- Database: SQLite

The backend server receives user queries and sends them to the AI model. The AI model processes the input and generates appropriate programming code, which is then displayed to the user.
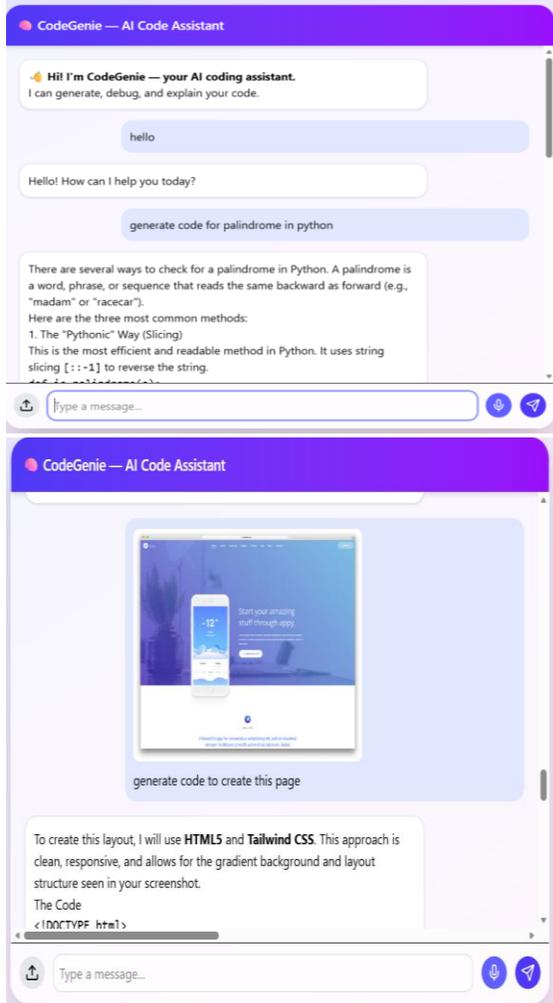
V. RESULTS AND DISCUSSION

The CodeGenie system successfully generates programming code based on user queries. The system allows users to interact using voice commands and image inputs, making it more convenient compared to traditional coding assistants.

The system improves productivity by helping developers generate code quickly and understand programming concepts effectively.

OUTPUT SCREENSHOTS

VIII. CONCLUSION

This paper presented CodeGenie, a voice and image driven automated software development assistant that helps users generate programming code using artificial intelligence. The integration of Google Gemini API enables the system to understand user queries and provide accurate coding solutions.

In the future, the system can be improved by supporting additional programming languages, improving image recognition capabilities, and integrating the tool with software development environments.

REFERENCES

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VI. ADVANTAGES

- Reduces coding time
- Supports multiple input methods
- Improves developer productivity
- Provides AI-driven development assistance
- Suitable for beginners and experienced programmers

VII. FUTURE WORK

Future improvements to the CodeGenie system include:

- Support for additional programming languages
- Integration with software development environments
- Advanced UI recognition from images
- Code debugging and optimization capabilities