



Ai-Driven Python Compiler & Algorithm Flowchart Generator

Vikas Patil¹, Tanay Koshti², Tanvi Rawal³, Piyush Patil⁴, Pranali N. Kale⁵

¹ Department of Computer Technology Sou. Venutai Chavan Polytechnic, Pune Email: patil.vikas6306@gmail.com

² Department of Computer Technology Sou. Venutai Chavan Polytechnic, Pune Email: tanaykoshti1@gmail.com

³ Department of Computer Technology Sou. Venutai Chavan Polytechnic, Pune Email: tanvirawal61@gmail.com

⁴ Department of Computer Technology Sou. Venutai Chavan Polytechnic, Pune Email: piyushpatil708@gmail.com

⁵ Lecturer and project guide Department of Computer Technology Sou. Venutai Chavan Polytechnic, Pune Email: pranalimane48@gmail.com

ABSTRACT :

A Python AI compiler called Skillzify has been included into an online learning environment to enhance the process of learning Python programming. In order to facilitate an interactive coding interface, the platform is built with modern web technologies including HTML, CSS, JavaScript, and an effective Python backend. Skillzify's primary goal is to provide customers with an intelligent platform for real-time Python code compilation, debugging, and execution.

Skillzify's AI-assisted help, which includes computer-aided coding generation, algorithm construction, and flowchart representation, is another essential feature. The platform adapts dynamically to the incoming interactions using machine learning-based algorithms, offering context-specific recommendations, error-explanation explanations, and unique learning materials that are reliant on the user's progress. This results in a more smooth and improved programming education experience.

It has an easy-to-use interface with a code editor, output viewer, and a built-in AI Chabot that delivers quick feedback. It also includes comprehensive documentation, flowcharts, and algorithmic diagrams to ensure an official learning process. Skillzify is not only a more advanced student learning tool, but it also demonstrates the potential of artificial intelligence in computer science learning reform, making it an excellent resource for both students and instructors.

1.INTRODUCTION :

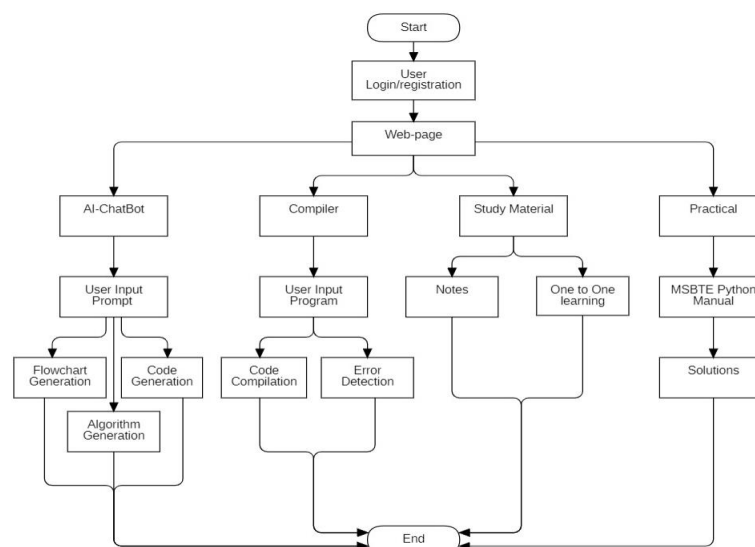
Python has become an essential programming language due to its adaptability, simplicity, and widespread adoption across industries such as web development, data science, automation, cybersecurity, and AI. Its clean, easy-to-understand syntax makes it ideal for beginners, contributing to its growing popularity in education.

To enhance Python learning, Skillzify, an Python Compiler with an ai-chatbot a Web-based application, provides an interactive platform that simplifies coding for beginners. By offering real-time feedback, error detection, and improvement suggestions, Skillzify enables learners to practice coding directly in their browsers without being overwhelmed by complex environments.

Beyond code compilation, Skillzify features an ai-chatbot which helps user to interact with and enables user doubt solving and understandable algorithm structure and simple flowchart generation. This AI-driven tool ensures a smoother learning experience by providing immediate feedback, clarifying doubts, and assisting in code optimization.

Overall, Skillzify makes Python more accessible and empowers beginners to build confidence in their coding abilities. It serves as an effective educational resource across multiple disciplines, including education, data science, and software development.

2. PROJECT WORKFLOW :



The proposed website workflow contains the subsequent components, a summary of its components and procedure is provided below :

1] Start:

- This is the initiation point of the process, indicating the beginning of the user's interaction with the website.
- User Login/Registration: This is a crucial step for user authentication and personalization. It ensures that users have accounts to access the website's features and potentially save their work.
- Web-page: This represents the central hub of the website, providing access to the four main functional areas: AI Chatbot, Compiler, Study Material, and Practical.

2] AI Chatbot:

- User Input Prompt: Users interact with the chatbot by entering questions or requests related to Python programming.
- Flowchart Generation: The chatbot can generate visual representations (flowcharts) of algorithms or code logic based on user input.
- Code Generation: The chatbot can generate Python code snippets based on user prompts or problem descriptions.
- Algorithm Generation: The chatbot can provide algorithmic solutions or explanations for programming problems.

3] Compiler:

- User Input Program: Users enter their Python code into the compiler interface.
- Code Compilation: The compiler attempts to translate the Python code into executable code.
- Error Detection: The compiler identifies and reports any syntax or semantic errors in the user's code.

4] Study Material:

- Notes: This section provides users with educational content, such as notes, tutorials, or documentation, to learn Python concepts.
- One-to-One Learning: This suggests the possibility of personalized learning or mentoring, perhaps through direct interaction with instructors or experts.

5] Practical:

- MSBTE Python Manual: This refers to a specific manual or resource related to the Python syllabus for the Maharashtra State Board of Technical Education (MSBTE).
- Solutions: This section likely provides solutions to practice problems or assignments, potentially related to the MSBTE curriculum.

6] End:

- This signifies the completion of the user's interaction with the website, whether they've used one or multiple features.

3.PROPOSED METHODOLOGY :

The main goal of the project is to create an AI-Driven Python Compiler that enhances learning through intelligent code generation, algorithm design, and flowchart visualization. Developed using an Agile methodology, Skillzify follows an iterative approach focused on continuous improvement and user feedback integration.

The development process begins with defining objectives, identifying user needs, and outlining core features such as AI-powered compilation, algorithm generation, and real-time feedback. The design phase involves structuring the system architecture, crafting intuitive UI/UX prototypes, and specifying technical requirements to ensure smooth interaction between components.

Implementation is carried out in iterative sprints, allowing for systematic feature development and refinement. The use of collaboration tools like Git ensures seamless teamwork and version control. Testing is an integral part of the process, involving unit tests, integration tests, and real-user assessments to validate platform usability and reliability.

Once the system is fully developed and refined, deployment takes place in a production environment with continuous integration and deployment (CI/CD) mechanisms for streamlined updates. To support users, training materials are provided, and post-launch monitoring is conducted to gather feedback and make further enhancements.

By following this structured methodology, Skillzify delivers an innovative AI-powered learning platform that transforms Python education, offering interactive coding assistance, intelligent learning support, and algorithm visualization for a comprehensive programming experience.

4. IMPLEMENTATION :

Skillzify is built using a combination of modern web and AI technologies to ensure an interactive and efficient Python learning experience.

Technologies Used:

- *Frontend:* HTML, CSS, JavaScript for a dynamic and responsive user interface.
- *Backend:* Python with Flask to handle compilation requests and AI-driven assistance.
- *AI Integration:* ChatBase BOT (Python Focused)
- *Database:* Firebase for User Authentication and Feedback storing.
- *Deployment:* CI/CD pipelines with Docker and cloud hosting services like AWS or Firebase for scalable deployment.

User Roles:

- *Students/Learners:* Can write, compile, and test Python code, receive AI-driven suggestions, and generate algorithm flowcharts.
- *Administrators:* Oversee platform maintenance, manage user roles, create and manage learning materials, and ensure system security.
- *Developers:* Continuously improve the AI compiler, Update website regularly, enhance features, and optimize system performance.

5. SCOPE FOR FUTURE WORK :

Three main areas will be the focus of the website: expanding programming language support, enhancing AI-driven learning, and improving user engagement. Skillzify aims to support additional languages like Java and C++, implement advanced AI for personalized coding assistance, and introduce gamification features like coding challenges and leaderboards. Real-time collaboration, voice-activated coding support, and LMS integration will enhance accessibility and institutional adoption. Community learning features such as peer-to-peer coding, collaborative projects, code sharing, discussion forums, and mentorship programs will foster a more interactive and supportive environment. These enhancements will make Skillzify a smarter, more engaging, and comprehensive learning platform.

6. CONCLUSION :

Skillzify has redefined Python programming education by integrating AI-driven compilation, real-time error detection, algorithm visualization, and structured learning paths. By aligning with the MSBTE Python manual, it ensures a well-guided curriculum, supplemented by interactive exercises that enhance both theoretical understanding and practical application. The platform's hands-on approach promotes active participation, strengthens problem-solving skills, and builds confidence in learners as they navigate real coding challenges. Additionally, Skillzify fosters a collaborative learning environment through peer-to-peer coding, mentorship programs, discussion forums, and more. The integration of gamification elements, LMS compatibility, and AI-driven learning support further enhances the user experience, making it a valuable resource for students, educators, and professionals alike. With a commitment to continuous innovation, Skillzify evolves with the latest advancements in educational technology. By equipping individuals with essential coding skills, it prepares them for success in an ever-evolving tech landscape, bridging the gap between education and industry demands.

7.ACKNOWLEDGMENT

We are grateful to our guide, *Mrs. P.N. Kale*, for her valuable guidance and support throughout this project. We sincerely appreciate the availability of technologies such as *Python, HTML, CSS, JavaScript, Firebase, and AI-powered tools*, which facilitated the development of Skillzify and enhanced its functionality.

This project has been a unique and enriching experience, and we owe its successful realization to the valuable insights, encouragement, and technical resources that made it possible. Thank you.

8.REFERENCES :

1. OMPC: an open-source MATLAB®-to-Python compiler
2. Design of AI-enabled Chatbot
3. A Customizable Multilingual Chatbot System for Customer Support