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GITSCOPE AI (AI-Powered GitHub Profile Analyzer)

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ABSTRACT

The GitHub AI Profile Reviewer & Roast Generator is a web-based application designed to analyze GitHub profiles and provide useful insights into a developer's skills, repositories, and coding activities. The system is developed using the MERN stack, which includes MongoDB, Express.js, React.js, and Node.js. The application allows users to register and log in securely using JWT authentication. By entering a GitHub username, users can view profile details, repositories, programming languages, followers, stars, forks, and other repository statistics. An AI-powered review module generates a funny roast, a professional profile review, strengths, weaknesses, improvement suggestions, and career guidance. The system also calculates a transparent profile score based on repository quality, activity, README quality, and other relevant factors. Additionally, users can save reviews, manage favorites, view previous analyses, and explore their GitHub activity through an interactive analytics dashboard. The application provides a responsive, dark-themed interface with a modular architecture that supports future enhancements. This project helps developers understand their online coding presence, identify areas for improvement, and strengthen their GitHub profiles for career opportunities.

Keywords: MERN Stack, GitHub API, Artificial Intelligence, Generative AI, GitHub Profile Analysis, AI-Based Code Profile Review, Roast Generator, JWT Authentication, MongoDB, React.js, Node.js, Express.js, Profile Scoring, Data Visualization, Developer Analytics, Career Guidance.

1. INTRODUCTION

The growth of software development and the increasing importance of online portfolios have made GitHub an essential platform for students and developers to showcase their programming skills, projects, and technical contributions. A well-maintained GitHub profile helps developers demonstrate their practical knowledge and improve their opportunities for internships and employment. However, many developers find it difficult to evaluate their profile quality, identify weaknesses, and understand which improvements are needed to strengthen their professional presence. Existing profile information provides useful statistics, but interpreting these details and converting them into actionable suggestions can be challenging.

With the advancement of web technologies and artificial intelligence, there is a growing need for intelligent platforms that help developers analyze and improve their GitHub profiles. An effective system should provide detailed profile information, repository statistics, programming language analysis, and personalized feedback. It should also help users understand their strengths and weaknesses, identify areas for improvement, and receive guidance on suitable technologies and career development.

The proposed system, GitHub AI Profile Reviewer & Roast Generator, aims to address these challenges by providing an integrated web-based platform for GitHub profile analysis and improvement. The application retrieves profile details, repositories, programming languages, followers, stars, forks, and other available statistics through the GitHub API. By integrating artificial intelligence, the system generates humorous roasts, professional reviews, strengths, weaknesses, improvement checklists, technology recommendations, and career advice. A rule-based scoring mechanism evaluates profile quality, while an interactive analytics dashboard presents available development activity and repository statistics through visual charts. Users can also save reviews, access previous analyses, manage favorites, and track recent searches. An optional recruiter mode supports the comparison of multiple GitHub profiles.

From a technical perspective, the system is developed using the MERN stack, which includes MongoDB, Express.js, React.js, and Node.js. Tailwind CSS is used to create a responsive, dark-themed user interface, while JWT authentication provides secure user access. RESTful APIs enable communication between the frontend and backend, and modular services support GitHub integration, AI-based reviews, profile scoring, and analytics.

2. SYSTEM INTERFACE

2.1 Home Page

The home page is the main interface of the GitHub AI Profile Reviewer & Roast Generator. It allows users to enter a GitHub username to explore and analyze the developer's profile, repositories, programming languages, and coding activity.

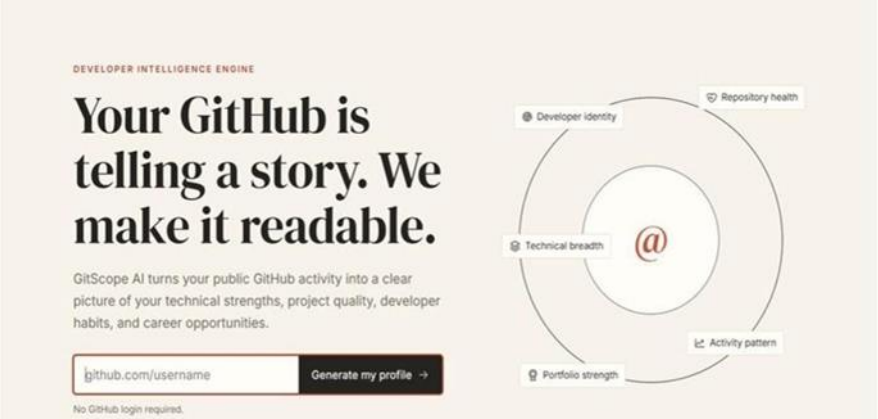


Fig. 1. Home page

2.2 Score Page

The scoring page evaluates a developer's GitHub profile and generates an overall developer score out of 100. The score is based on factors such as repository quality, programming language diversity, project documentation, GitHub activity, stars, forks, and contribution consistency. The page displays the overall score along with category-wise performance metrics and visual charts, helping developers identify their strengths, understand their weaknesses, and improve their GitHub profile.

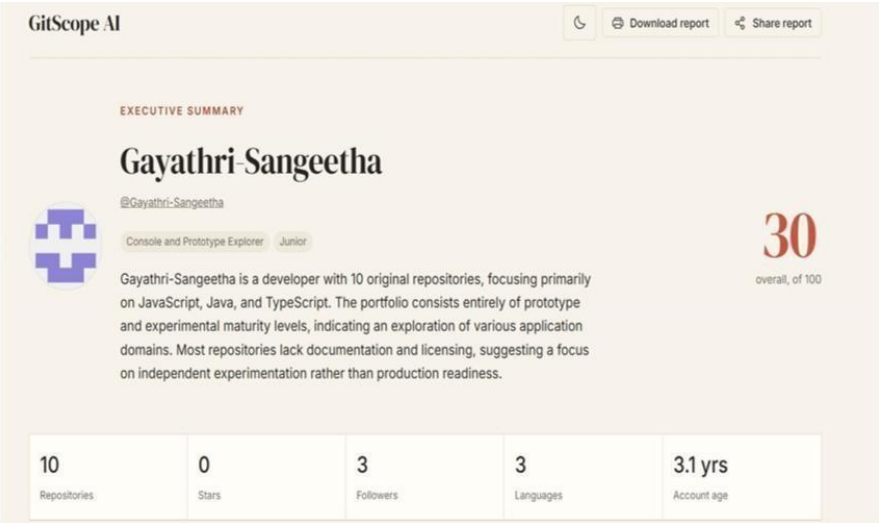


Fig. 2. Score page

2.3 Developer Scorecard Page

The Developer Scorecard page provides a detailed summary of a developer's technical skills, GitHub activity, and development progress. It presents important metrics such as total repositories, followers, stars, programming languages, and contribution activity in a structured format. The scorecard helps developers understand their technical profile and present their achievements more effectively to recruiters.

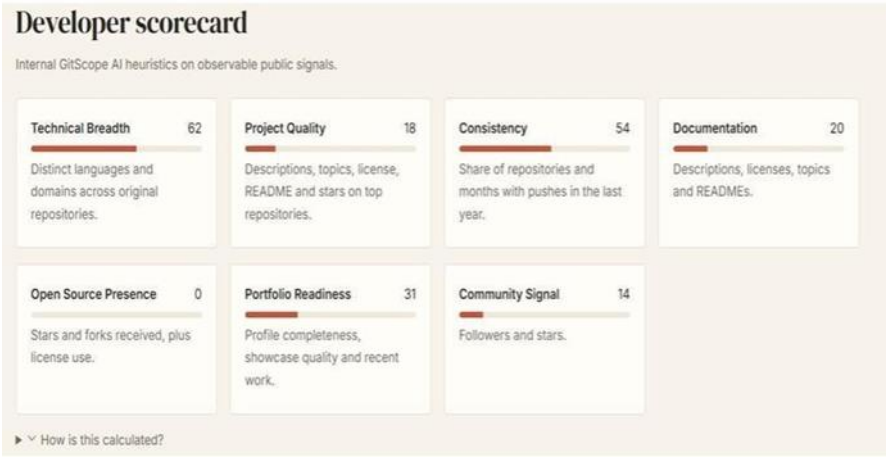


Fig. 3. Developer scorecard page

2.4 Repository Intelligence Page

The Repository Intelligence page provides a detailed analysis of a developer's GitHub repositories. It displays important information such as repository names, programming languages, stars, forks, commit activity, and project documentation. The page helps users understand the quality, popularity, and overall performance of their projects. Through organized repository details and visual insights, developers can identify project strengths, discover areas for improvement, and enhance the quality of their GitHub profile.

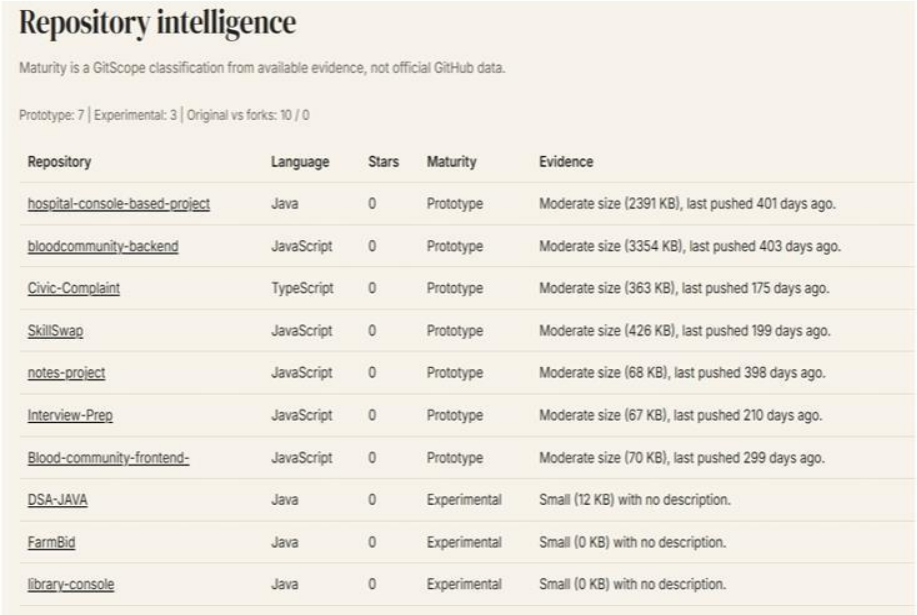


Fig. 4. Repository intelligence page

2.5 Interview Preparation Page

The Interview Preparation page is designed to help users improve their technical knowledge and prepare for job interviews. This page provides interview-related questions based on programming skills, technical concepts, and project experience. It helps users practice answering questions, strengthen their problem-solving abilities, and identify areas for improvement. The simple and user-friendly layout allows users to access relevant interview preparation materials efficiently, helping them build confidence and improve their performance in technical interviews.

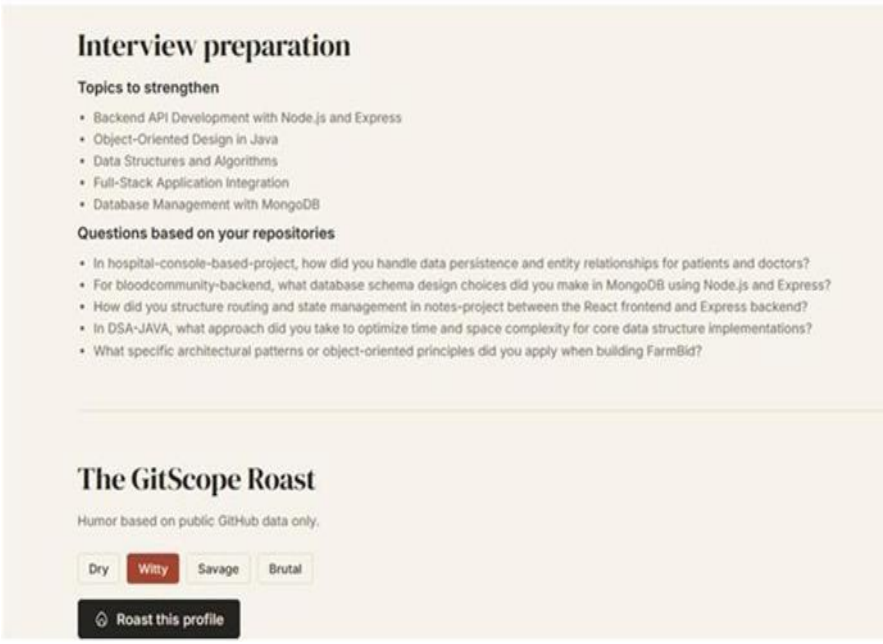


Fig. 5. Interview preparation page

3. FUNDAMENTAL TECHNIQUE

The GitHub AI Profile Reviewer & Roast Generator uses fundamental techniques to analyze GitHub profiles and provide useful insights into a developer's coding activities. The system integrates GitHub API data retrieval, profile analysis, repository evaluation, programming language identification, and developer activity tracking. It uses authentication and structured data processing to ensure secure access and organized presentation of profile information. By combining these techniques with an interactive and user-friendly interface, the system helps developers understand their strengths, identify areas for improvement, and enhance their GitHub profiles for better career opportunities.

4. PROPOSED METHODS

The proposed methods of GitScope AI (AI-Powered GitHub Profile Analyzer) focus on developing an intelligent and user-friendly platform to analyze GitHub profiles, evaluate repository quality, and provide personalized feedback using modern web technologies and artificial intelligence. These methods aim to help developers understand their technical strengths, identify areas for improvement, and enhance their professional GitHub presence. By integrating GitHub API services, AI-based review generation, profile scoring, and interactive analytics, the system provides a structured approach to developer profile evaluation.

4.1 User Authentication and Profile Management

The system provides a secure authentication mechanism that allows users to register and log in to the application. JWT (JSON Web Token) authentication is used to manage authorized access to protected resources. User details are stored in MongoDB, enabling the application to maintain user information and associate generated reviews with the appropriate accounts. This method improves security and provides a personalized environment where users can manage their profile analyses, saved reviews, and favorites.

4.2 GitHub Profile Integration

The system integrates the GitHub API to retrieve publicly available profile information and repository details using a GitHub username. The collected information includes the number of repositories, followers, following, stars, forks, programming languages, and other available statistics. Repository details are presented through organized repository cards, making it easier to understand a developer's projects and technical activities. In-memory caching helps reduce repeated API requests, while error handling and GitHub token support help manage invalid usernames and API rate limits.

4.3 AI-Based Profile Review and Roast Generation

The application incorporates an AI service, such as the Gemini API or OpenAI API, to analyze collected GitHub profile information and generate meaningful feedback. The system produces a funny roast, a professional review, strengths, weaknesses, an improvement checklist, suggested technologies

to learn, and career advice. Separate AI prompt services and structured JSON responses help maintain consistency in the generated results. Output validation and error handling improve reliability and ensure that users receive useful feedback even when an AI request fails.

4.4 Review History and Favorites Management

The system stores generated reviews in MongoDB so that users can access their previous analyses without repeating the entire review process. Each saved review contains details such as the GitHub username, timestamp, roast, professional review, and improvement checklist. Users can add or remove reviews from their favorites and access their recent searches. This method provides convenient review management and helps developers revisit earlier feedback while working on their technical profiles.

4.5 Rule-Based GitHub Profile Scoring System

The application implements a transparent, rule-based algorithm to calculate a GitHub profile score ranging from 0 to 100. The scoring mechanism considers factors such as repository quality, README quality, stars, forks, commit consistency, language diversity, pinned repositories, and contribution activity, where the necessary data is available. The overall score and category-wise scores are displayed using progress bars and radar charts. Suggestions are also provided for improving individual categories. This method enables developers to understand how different aspects of their GitHub profiles contribute to the overall evaluation.

4.6 Interactive Developer Analytics Dashboard

The system provides an analytics dashboard to visualize repository information and development activity through interactive charts. It includes commit heatmaps, monthly activity, programming language usage, repository growth, and star growth, depending on the availability of historical data. Visual representations help users identify activity patterns, understand their technology preferences, and monitor changes in their GitHub presence. This method converts raw repository statistics into understandable visual insights and supports better evaluation of development progress.

4.7 Recruiter Mode and Profile Comparison

The application optionally provides a recruiter mode that allows users to compare two or three GitHub profiles simultaneously. The comparison considers factors such as repository counts, programming languages, stars, followers, activity, and profile scores. Results are displayed side by side to make differences between profiles easier to understand. The system can also support exporting comparison results in PDF or JSON format. This method helps recruiters and developers evaluate publicly available profile information using a consistent set of criteria without duplicating existing analysis logic.

4.8 Security, Error Handling, and Deployment

The system follows a modular architecture that separates frontend components, backend routes, controllers, models, and service logic. Input validation, centralized error handling, Helmet security headers, and API rate limiting are incorporated to improve application reliability and security. Environment variables are used to protect sensitive configuration values, including database credentials, JWT secrets, and API keys. Docker and Docker Compose support deployment of the frontend and backend, while a professional README provides installation instructions and project documentation.

5. RESULTS AND DISCUSSIONS

The GitHub AI Profile Reviewer & Roast Generator is designed to provide an integrated platform for evaluating GitHub profiles and improving developers' online portfolios. GitHub API integration enables the collection and presentation of profile and repository statistics, while AI-generated reviews provide personalized feedback on strengths, weaknesses, and possible improvements. The rule-based scoring system offers a transparent evaluation of profile quality, and the analytics dashboard presents available development activity through interactive visualizations. Review history and favorites allow users to retain and revisit previous analyses, while optional recruiter mode supports side-by-side profile comparisons. The modular MERN architecture supports organized data management, reusable components, and communication between frontend and backend services.

However, the quality of the generated reviews depends on the available GitHub data and the AI service's output. API rate limits, missing historical information, private repositories, and network connectivity may affect some features. The scoring system also provides an indicative assessment rather than a definitive measurement of a developer's actual programming ability.

6. CONCLUSION AND FUTURE ENHANCEMENTS

The proposed system provides an intelligent and structured approach to GitHub profile analysis by combining repository statistics, AI-based feedback, rule-based scoring, and interactive analytics in a single web application. It helps developers identify areas for improvement, understand their technical strengths, and receive guidance for enhancing their GitHub portfolios. The use of the MERN stack, JWT authentication, MongoDB, and modular REST

APIs supports a responsive, maintainable, and scalable application. Future enhancements may include more detailed repository quality analysis, personalized learning roadmaps, improved contribution analysis, additional AI models, and advanced recruiter comparison features.

7. FUTURE SCOPE

The GitHub AI Profile Reviewer & Roast Generator provides an effective platform for analyzing GitHub profiles and generating personalized feedback. However, several opportunities exist to enhance its capabilities and make it more useful for students, software developers, job seekers, and recruiters. Future developments can focus on deeper repository analysis, personalized learning recommendations, real-time activity monitoring, and integration with other developer platforms.

7.1 Advanced Repository Quality Analysis

Future versions can analyze repository structure, code organization, documentation quality, testing practices, and project maintainability in greater detail. This would help developers identify incomplete projects, improve README files, and follow better software development practices.

7.2 Personalized Learning Roadmap

The system can be enhanced to generate personalized learning roadmaps based on a developer's programming languages, existing projects, and identified skill gaps. It can recommend suitable technologies, practice projects, and learning resources according to the user's current skill level and career goals.

7.3 Continuous GitHub Activity Monitoring

Future enhancements can include periodic monitoring of public GitHub profile activity and repository updates. The system can track changes in repository counts, stars, followers, programming language usage, and available contribution statistics.

7.4 AI-Powered README and Project Description Generator

The application can introduce an AI-based feature to generate or improve README files and project descriptions. Based on repository information and user-provided project details, the system can suggest project objectives, technology stacks, installation instructions, feature descriptions, and usage guidelines.

7.5 Resume and Job Description Matching

The system can be extended to compare a developer's GitHub profile with a job description or internship requirement. By identifying relevant projects, programming languages, and technologies, it can highlight matching skills and potential gaps.

7.6 Advanced Profile Scoring and Benchmarking

Future versions can improve the existing rule-based scoring system by introducing configurable evaluation criteria and more detailed category-wise analysis. Developers could compare their current scores with their own previous results and evaluate improvements over time. Score explanations and category-specific recommendations would make the evaluation more transparent.

7.7 Integration with Additional Developer Platforms

The application can be integrated with platforms such as GitLab, Bitbucket, and LeetCode, where suitable APIs or authorized data access are available. Combining information from multiple platforms could provide a broader view of a developer's projects, coding practice, and technical activities. This would help users maintain a more comprehensive technical portfolio in one place.

7.8 Automated Portfolio Report Generation

The system can support the generation of downloadable PDF reports containing GitHub profile information, repository highlights, AI-generated reviews, category scores, and improvement recommendations. Users could customize reports for placement preparation, internship applications, or personal progress tracking. This feature would make it easier to share a structured summary of their development activities with mentors and recruiters.

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