Bouldering Gym Review Project Report

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1 Introduction

The Bouldering Gym Review application is a decentralized platform that allows users to review and comment on various bouldering gyms. Currently, Hong Kong has 1-2 bouldering gym review pages, such as `https://panpa.hk/explore-climbing-gyms/`, but these are not updated. Originally, Yuen Long had a bouldering gym named Climbing Park, which has since closed and changed to "First Climb." This information is not reflected on the previous website. Therefore, this application is created to provide more up-to-date information on bouldering gyms in Hong Kong, leveraging smart contract technology to ensure that reviews are immutable and transparent.

2 Project Description

The project includes:

- A self-developed smart contract for managing gym data and reviews.
- A corresponding front-end interface developed using React and ethers.js.

The smart contract is deployed on the Ethereum Sepolia Test Network at address `0xe2978036e3813bb6a191fbf20f5adacb036facbf`.

3 Smart Contract Functionality

The smart contract, `BoulderingGymReview`, provides the following functionalities:

- **Add Gym:** Users can add gyms with their name and location. This feature allows for the dynamic inclusion of new gyms, ensuring that the database is continually updated. When a gym is added, it is recorded on the blockchain, making it immutable and verifiable. Users must provide a valid name and location for the gym to be successfully registered, enhancing the richness of available options for future reviewers.

- **Remove Gym:** Authorized users, specifically the gym creator or the contract owner, can remove a gym. This feature is critical for maintaining the accuracy of the gym list. If a gym closes or is no longer relevant, it can be marked as removed, ensuring users only see current and available options. This helps prevent confusion and maintains the integrity of the review system.

- **Submit Review:** Users can submit reviews containing parameters such as cleanliness, size, difficulty, overall experience, and a text review. Each review is structured to provide comprehensive feedback, with ratings ranging from 1 to 5 for each parameter. This allows potential visitors to gauge the gym's quality based on multiple criteria, enhancing the decision-making process for climbers looking for suitable locations.

- **Get All Gyms:** Users can retrieve a list of all gyms along with their average ratings. This feature aggregates data to provide a quick overview of available bouldering gyms, making it easier for users to compare options. The average ratings reflect the overall user satisfaction and help climbers make informed choices based on collective feedback.

- **Get Reviews:** Users can fetch reviews for a specific gym, allowing them to view detailed feedback from others. This feature enhances transparency and trust in the review process. Each review includes the reviewer's address, cleanliness rating, size rating, difficulty rating, overall rating, review text, and timestamp. This comprehensive data helps users assess the gym's quality and suitability for their climbing preferences.

Some additional information about the gym, such as a link to their page, was desired. However, this created stack issues in the smart contract due to the excessive number of local variables. As a result, this feature was not implemented in the project.

4 Front-End Application

The front-end application is built using React and connects to the smart contract via ethers.js. It includes:

- A user-friendly interface for adding gyms and submitting reviews.
- Modal dialogs for adding gyms and reviews.
- Display of gyms with their average ratings and reviews.

5 Features

The application includes the following features:

1. **User Authentication through MetaMask:** Users can connect their Ethereum wallets via MetaMask, ensuring secure access to the application and enabling interaction with the smart contract.

2. **Add and Remove Gyms:** Users have the capability to add new gyms to the platform or remove existing ones. This feature ensures that the gym database remains current, reflecting real-world changes in the bouldering landscape.

3. **Submit and View Reviews:** Users can submit detailed reviews that include ratings for cleanliness, size of the gym, difficulty of route , and overall experience. Each review provides valuable insights for other climbers, helping them make informed decisions about which gyms to visit.

6 Testing

The project includes a comprehensive testing suite using the platform `https://mycontract.fun/`, here are the screenshots and logs of the testing process and interactions:

```
(1/3)🧬Compiling contract: test_20849751_1747620969.sol
[✅PASS]Compilation
(2/3)🤖Generating test case for: test_20849751_1747620969.sol
[✅PASS]Read contract
[ℹ️INFO] Contract file already exists in destination, skipping adjust.
[⚠️WARNING]No </think> tag found in input
[✅PASS]Test case generation
[✅PASS]Write test contract file
(3/3)🧪Running tests in test_20849751_1747620969.t.sol
(🧪Attempt 1/3)
[ℹ️INFO] Encountered compilation error, applying automatic fixer
[⚠️WARNING]No </think> tag found in input
[✅PASS]Corrected test contract with compilation error
[✅PASS]Updated test file
(🧪Attempt 2/3)
[ℹ️INFO] Encountered compilation error, applying automatic fixer
[⚠️WARNING]No </think> tag found in input
[✅PASS]Corrected test contract with compilation error
[✅PASS]Updated test file
Suite result: ok. 16 passed; 0 failed; 0 skipped; finished in 3.89ms (2.78ms CPU time)

Ran 1 test suite in 1.27s (3.89ms CPU time): 16 tests passed, 0 failed, 0 skipped (16 total tests)

🧹Start Cleaning
[✅PASS]Moved test file to 'finished'
```

Figure 1: The logs of testing the smart contract

All the test cases and logs are saved to the directory `./contract` with the name `contract.test.sol` and `testResult.log`.

7 Deployment

The repository of the page can be found accessed at: `https://github.com/STsAiR/bouldering-review`

The application is hosted on GitHub Pages and can be accessed at: `https://stsair.github.io/bouldering-review`.

8 Conclusion

The Bouldering Gym Review project successfully demonstrates the use of blockchain technology in creating a decentralized review system. The smart contract ensures data integrity, while the front-end application provides a seamless user experience.