1. Project Background and Goals

1.1 Project Background

Fei Hua Ling (Flying Flower Game) is an ancient Chinese poetry game, where participants need to quickly come up with an answer based on a given character or word. These answers must usually conform to certain poetic rules or cultural contexts. In modern times, Fei Hua Ling not only serves as a means of preserving traditional culture but has also become a form of entertainment in many cultural events. To enrich the interactive experience of Fei Hua Ling and allow players to gain a deeper understanding of Chinese classical poetry while enjoying the game, this project plans to develop a Fei Hua Ling Q&A game based on a poetry large model.

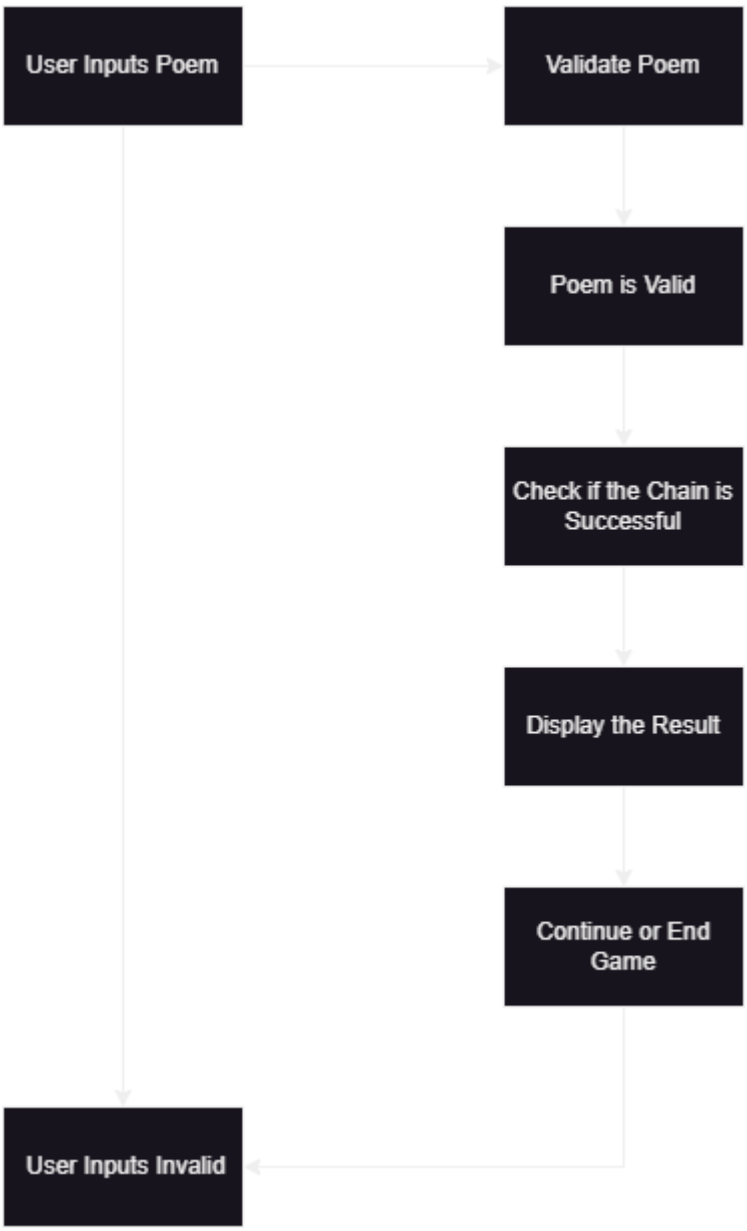
This game will integrate natural language processing technology and a large database of ancient poems to provide players with a more intelligent and engaging Fei Hua Ling experience, thereby inspiring players' interest in poetry and culture. The specific objectives are as follows:

- Provide a large language model that includes poetry knowledge and can generate answers that follow Fei Hua Ling rules.
- Design the game mechanics for Fei Hua Ling, including game rules, question generation, and answer judgment systems.
- Provide players with poetry analysis, historical background, and other supplementary functions to help them better understand the content of the poems.

2. Functional Requirements

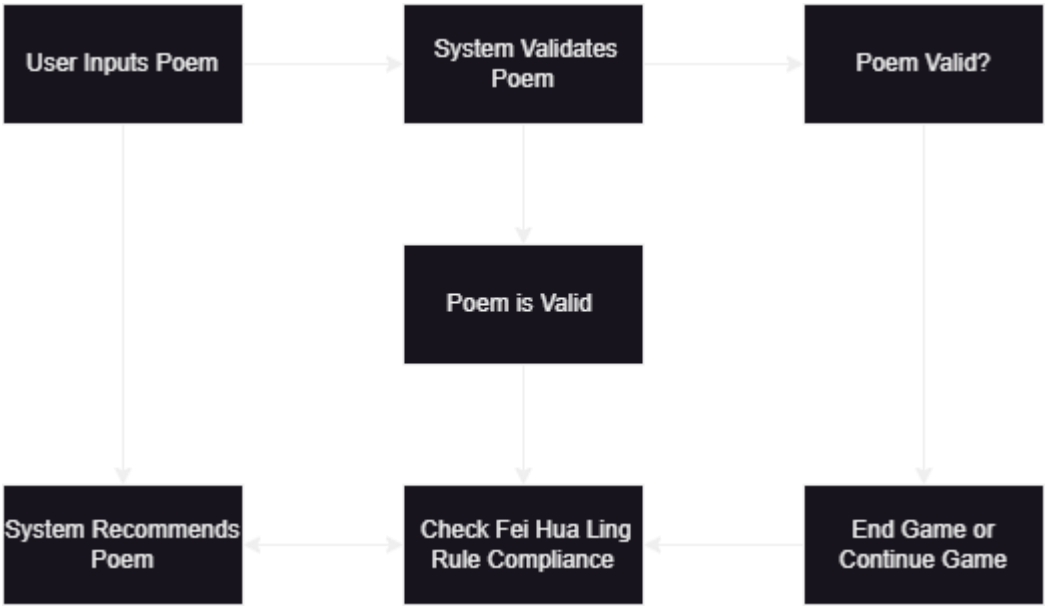
2.1 Poetry Generation and Judgment

- **Input Parsing**: The system should immediately parse the character or word provided by the player and generate a poem that conforms to the Fei Hua Ling rules.
- **Poetry Matching**: Ensure the system-generated poem follows the rules of the ancient poetry game, such as rhyme, word pairing, etc.
- **Poetry Database**: Use a filtered and categorized ancient poetry database.
- **Automatic Judgment**: Based on the player's input, the system should automatically judge whether it follows the game rules and provide feedback. If the input is invalid (e.g., incorrect word pairing, formatting errors), the system should prompt the player with an error.

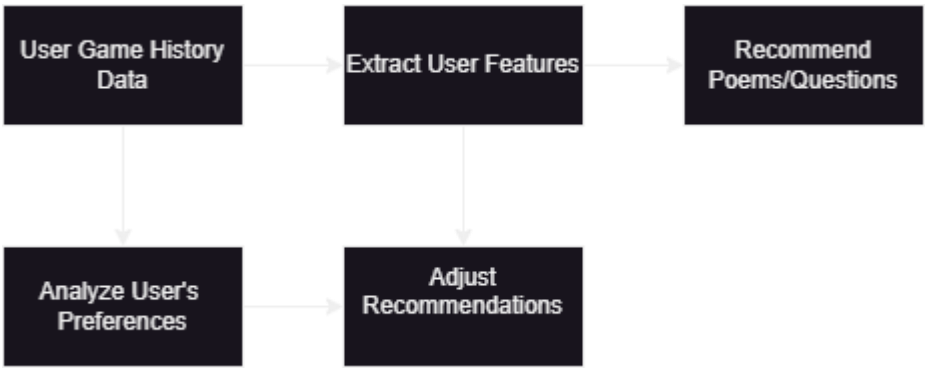


2.2 Game Mode

- **Fei Hua Ling Mode**: Players can play against the system, where the system automatically generates questions and judges the correctness of the player's answers.



- **Poetry Analysis**: Provide players with detailed analysis of each poem, including its background, author biography, historical and cultural context.
- **Interactive Learning**: Through gamified methods, players can gradually deepen their understanding and memory of poems during the gameplay.



2.3 User Interaction and Feedback

- **Real-time Feedback**: After every answer submission, the system should provide immediate feedback on the correctness of the answer, along with a prompt indicating whether the answer was accepted.

2.4 Poetry Large Model Integration

- **Poetry Generation Model**: Integrate a trained poetry model that automatically generates rule-conforming poetry from the classical poetry database.
- **Natural Language Understanding and Generation**: The model should be able to understand the player's input and generate appropriate poetic responses, adhering to the Fei Hua Ling requirements.
- **Dynamic Updates and Optimization**: Regularly update the poetry database and model, adding new poems and famous lines, to continually improve the quality and diversity of generated poetry.

3. Technical Requirements

3.1 System Architecture

- **Frontend**: Use modern web or mobile frameworks such as React, Vue, or Flutter.
- **Backend**: Implemented in Python, utilizing frameworks like Flask, Django, or Spring Boot.
- **Poetry Large Model**: APIs from large language models like StarFire, Chat-GPT, or others can be used, combined with Chinese NLP technology for poetry generation.

3.2 Model Requirements

- **Training Data**: Large amounts of poetry text data covering various historical periods, including Tang Poetry, Song Ci, Yuan Qu, etc. The data should be standardized and cleaned to remove irrelevant content.
- **Poetry Rules**: The model should learn and comply with basic poetry formats and rhythmic requirements, capable of generating poems that follow rhyme, parallelism, and tone rules.
- **Natural Language Processing Capability**: The model needs to have strong Chinese natural language understanding abilities, capable of analyzing and generating poems that fit the context and historical background.

4. User Requirements

- **Easy to Learn**: The game should be designed with simple and understandable gameplay suitable for users of all ages and cultural backgrounds, especially those interested in traditional culture.
- **Highly Interactive**: The game should provide a fun and interactive experience, and future updates should introduce more gameplay features to increase interactivity and engagement.
- **Learning and Entertainment Combined**: The game should not only serve as an entertainment tool but also help players enhance their literary knowledge and appreciation of poetry.

5. Non-functional Requirements

5.1 Performance Requirements

- **Response Time**: The system should ensure quick responses, providing feedback within 1-3 seconds after user input.
- **Scalability**: The system architecture should support quick expansion, making it easy to implement additional features in the future.
- **High Availability**: The system should ensure high availability to prevent game interruptions due to failures.

5.2 Security Requirements

- **Data Protection**: Ensure the security of user data in compliance with relevant laws and regulations (e.g., the "Personal Information Protection Law").

5.3 User Experience Requirements

- **User Interface**: The UI design should be simple, intuitive, and easy to operate, adaptable to different device screen sizes.
- **Smooth Experience**: The game should load and run smoothly, minimizing lags and delays.

6. Development and Future Planning

- **Enriching Poetry Content**: Over time, the plan is to gradually enrich the poetry database, adding more ancient poetry, modern poetry, etc., to meet the needs of players from different cultural backgrounds.
- **AI Learning and Optimization**: As players use the system, the system should continuously learn and optimize the poetry generation algorithm, improving the quality and diversity of the generated poetry