CSCI3100 Project: Pac-Man

DFD Specification Document

Group A8

BAI, Yuan 1155157073
BAO, Wenrui 1155157220
LI, Jianqiang 1155157143
YUE, Haoyuan 1155157271
ZHANG, Juyuan 1155160257

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CSCI3100 Software Engineering
The Chinese University of Hong Kong

Contents

1 High-Level Context Diagram

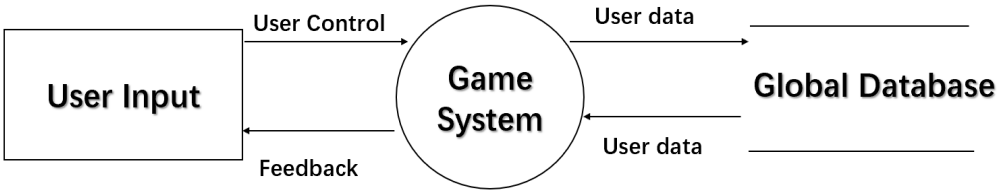

Figure 1: Context Diagram

Generally, the user can give the user data to control and decide the next step they want to do, and the Game System will give the feedback state the user can see. During the game processing, the global database may store the updated game process data.

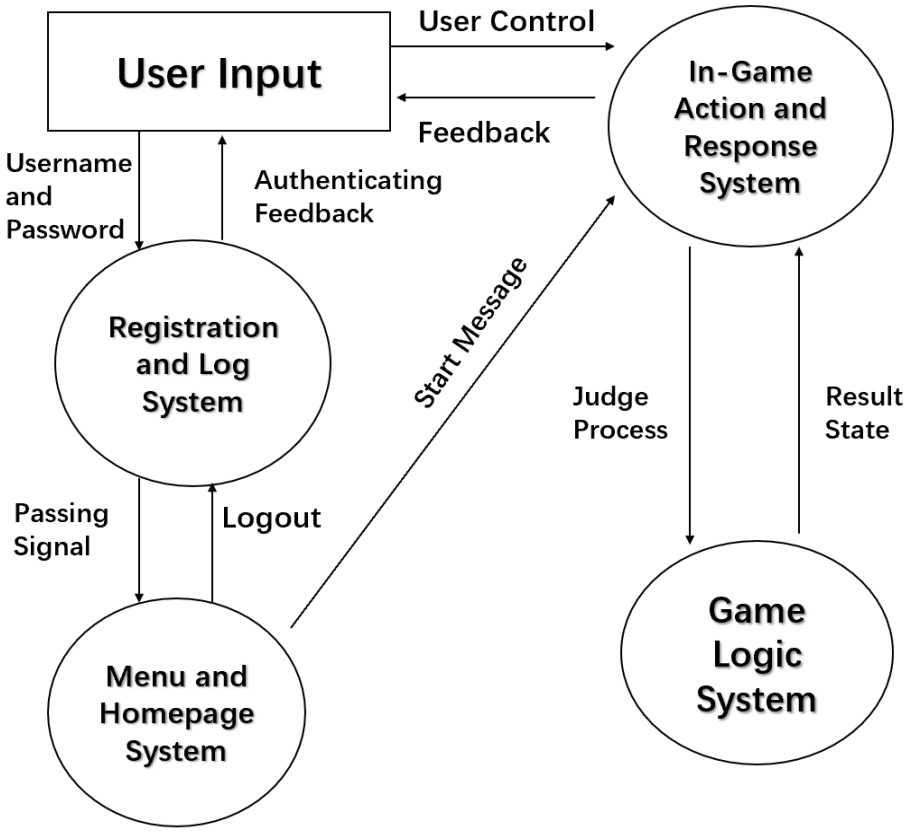

Figure 2: Component System Diagram

More specifically, a new user can give an account and password to pass the registration system and see the menu. In the menu homepage the user has multiple choices, start the game, function mode, settings, help, or just logout. And then during the game processing, the In-Game system will use Game logic to transfer the user control to the feedback states which the user can see.

2 Feature Diagrams

2.1 Account System

2.1.1 Account Registration and Password changing

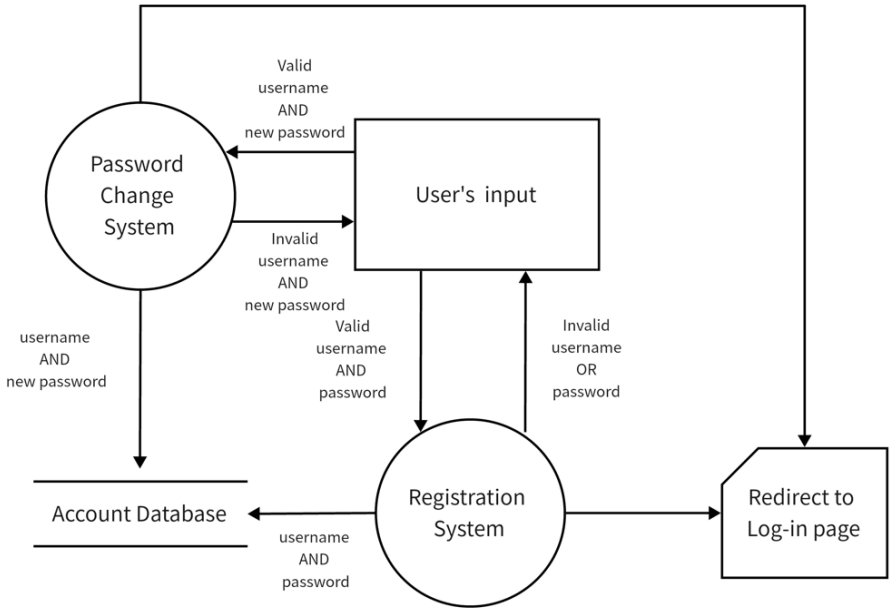

Figure 3: Account Registration

A user can register his own account and must set a username and password. After successful registration, this account will be stored in the account database. The password for any account can be changed, and the database will be changed at the same time.

2.1.2 Log-in and Log-out

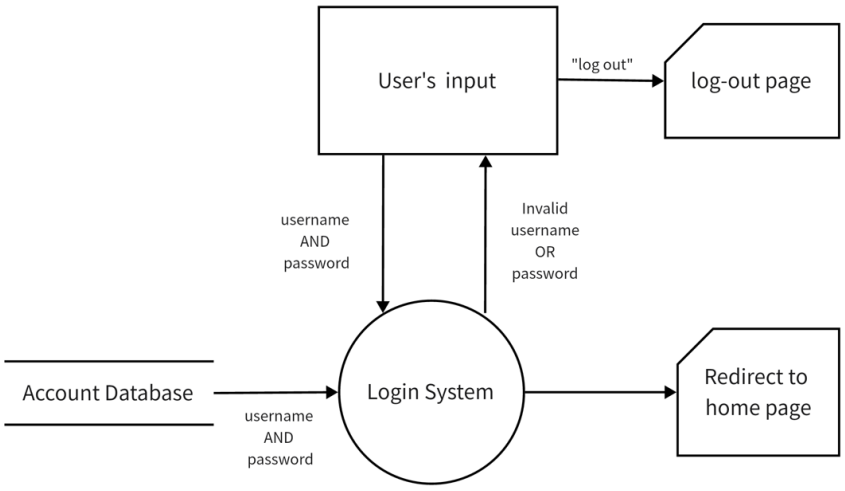

Figure 4: Log-in and Log-out

After registration, the user can log in by using a username and password. If the user login successfully, the system will show the homepage of the game to the user. Otherwise, the system will show a notification of "wrong username or password."

2.2 Homepage trigger

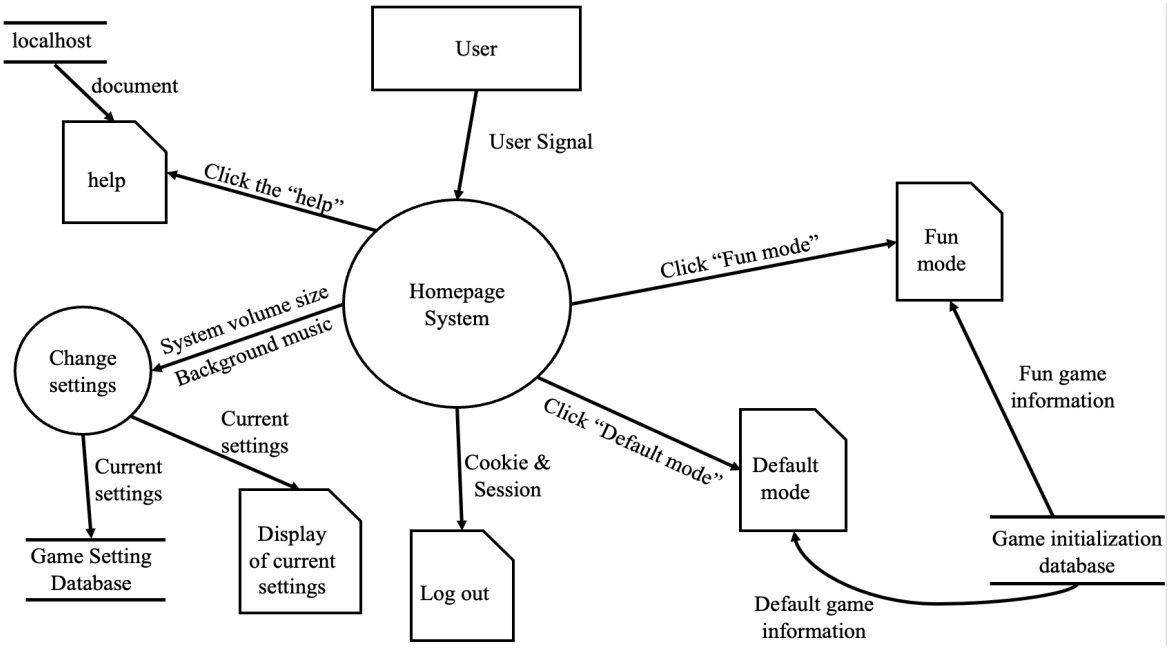

Figure 5: Homepage

The Homepage System is the main interface of the game. It serves as a bridge to connect most of the functions. The interface consists of several buttons to trigger all systems in the game, such as the "default mode" system, the "fun mode" system, "help" document, "settings" system, "log-out" system and "exit" system. Therefore, through the homepage, users can trigger the functions such as changing volume size and background music and starting games with different modes.

2.3 Game Logic Control

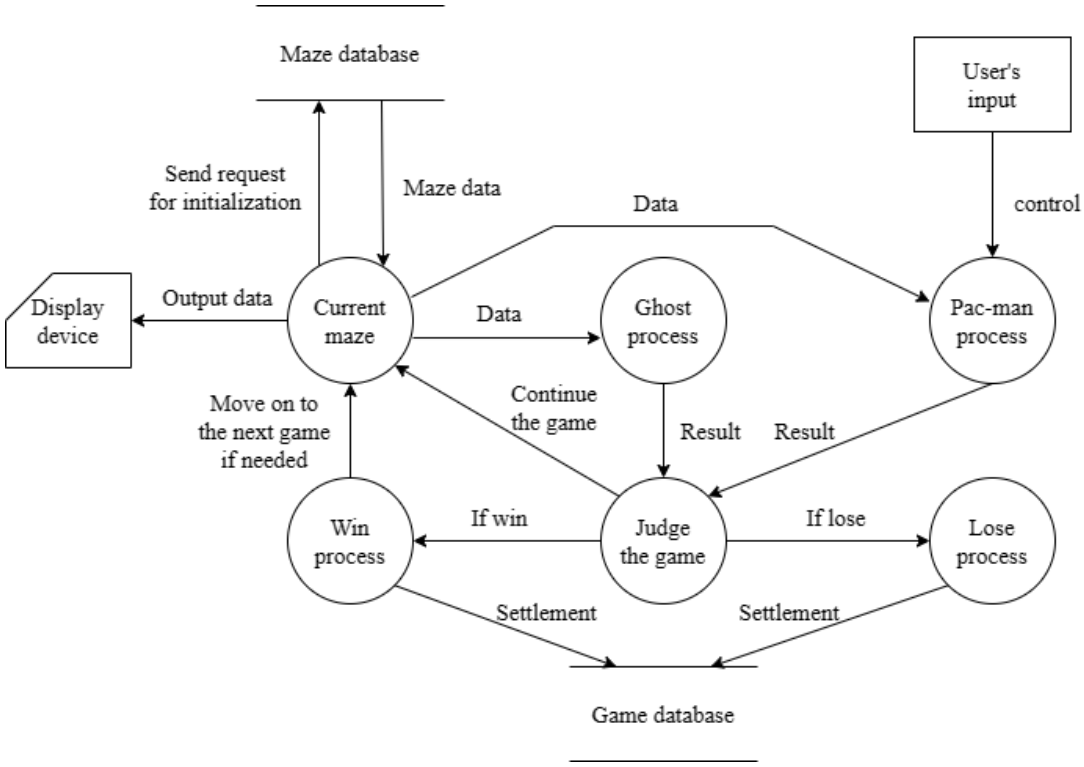

Figure 6: Game logic

A game starts from getting data from the maze database and initializing the game. The display device obtains data from the current maze to output as images and sounds. In each logical process, the current maze gives the relevant data to Pac-man and the ghost to process information and update the status. Pac-man is controlled by user operation. After processing, the current state of the game will be judged. If the game wins, enter the win process, settle the data and enter the next level when the conditions are met; If the game loses, it will settle the data and exit the game; Otherwise, the current game will continue.

2.4 Pac-Man agent

2.4.1 User-controlled Agent

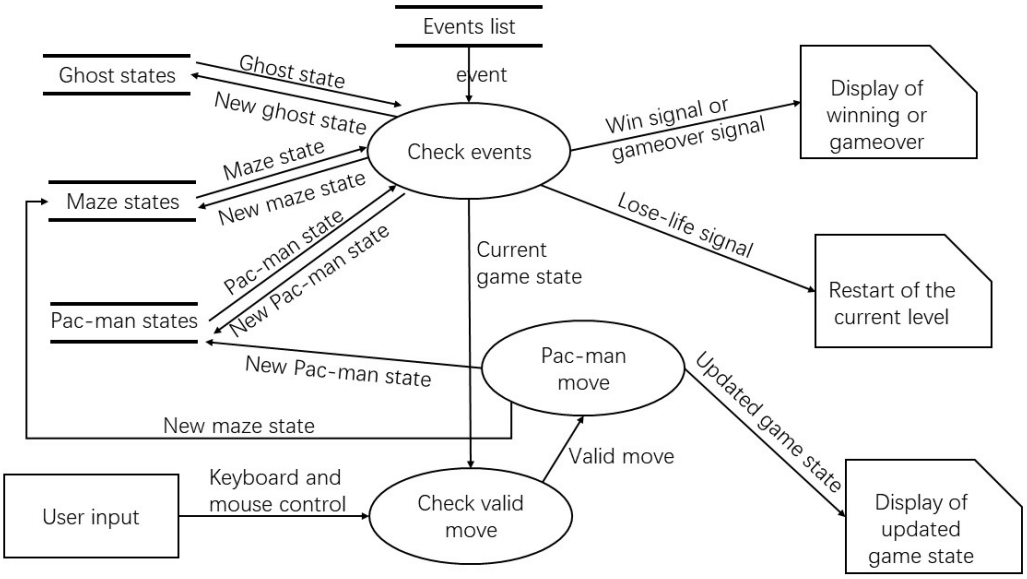

Figure 7: User-controlled Pac-Man agent

At each iteration, the Pac-Man agent first refers to the current game state to check event occurrence. Current game state consists of ghost state (live or dead, current position, current direction, etc), maze state (walls, remaining dots, remaining items, etc), and Pac-man state (lives left, current position, remaining buff, etc). If winning event (no remaining dots in maze) or gameover event (lose and no lives left for Pac-Man) occurs, jump out of the iteration and display the winning or gameover message. If lose-life event (lose with lives left) occurs, jump out of the iteration and restart the current level game. For other events like eating dots, hitting ghosts, getting items, losing buff, or just nothing, the agent updates the involved states and then passes the new game state to check valid move function. Based on settings and current game state, user's keyboard and mouse inputs are checked and a valid move will be generated. After moving, the new game states are updated and displayed. Then the game goes to next iteration.

2.4.2 AI Agent

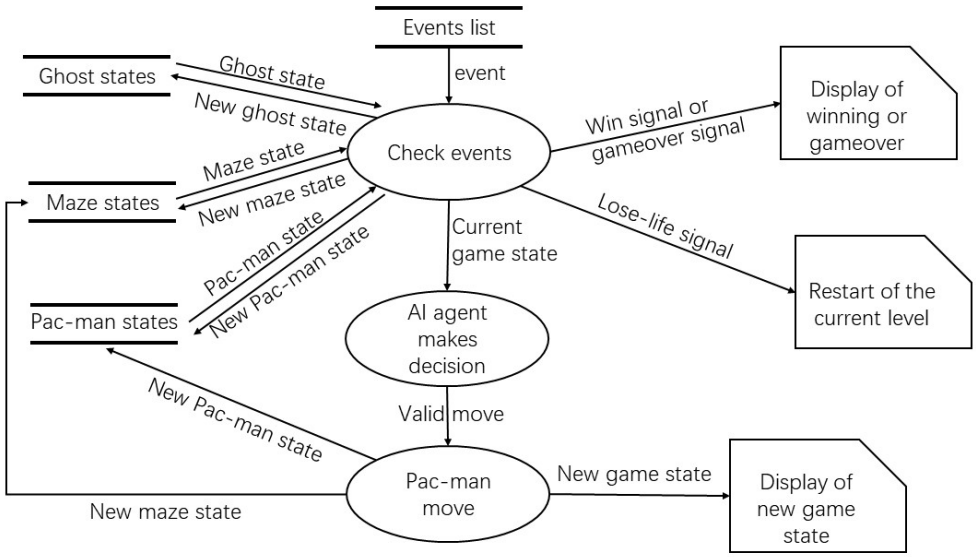

Figure 8: AI-controlled Pac-Man agent

The AI agent is basically the same as the user-controlled agent. Instead of getting user input and checking validation, an AI decider gives a valid move based on the current game state.

2.5 Ghost agent

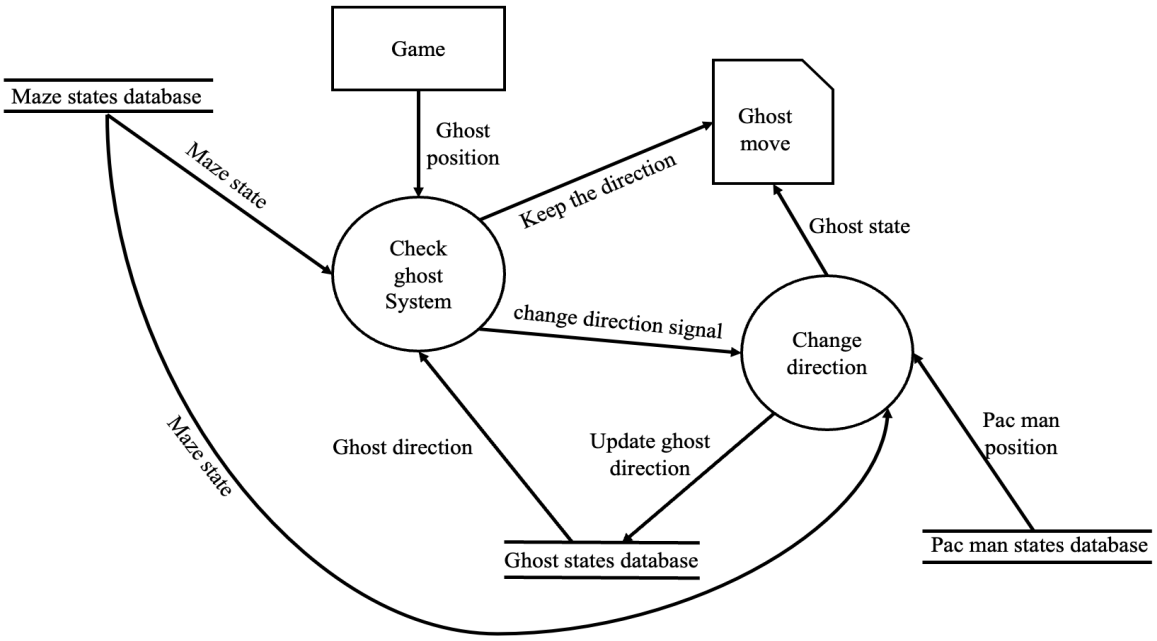

Figure 9: Check ghost

The "check ghost" system can check whether the ghost hits the boundary of maze and change the direction of ghost according to the position of Pac man, which will make the ghost get closer to Pac man.