

Project Summary: AI-Powered Codenames Game

Project Description

The 'AI-Powered Codenames Game' is a multiplayer strategy word game where two teams compete to identify all their words on the board before the opposing team. The game runs in a web browser and allows real-time multiplayer interaction. The AI acts as both the Spymaster (providing clues) and the Agent (guessing words).

Objectives

- Each team must identify their words using the Spymaster's clue.
- The Spymaster provides a single-word hint connecting multiple words on the board.
- Agents must guess the words related to the clue.
- Selecting the opposing teams word benefits them.
- Selecting the 'Assassin' word results in an immediate loss.

Technologies Used

Frontend:

- JavaScript, HTML, CSS for UI development.
- (Optional) React.js for a modular, efficient interface.

Backend:

- ASP.NET Core (C#) for managing game logic.
- SQL Server for persistent data storage.
- Firebase for real-time communication.
- OpenAI GPT for clue generation.
- Word Embedding (Word2Vec, GloVe) for intelligent word guessing.

Real-Time Communication:

- Firebase Firestore / Realtime Database for instant updates.
- (Future Option) WebSockets for enhanced performance.

AI Integration:

- GPT-4 (OpenAI API) for generating meaningful clues.
- Word Embedding for smart word associations.
- ML.NET (Future enhancement) for advanced AI capabilities.

Hosting and Deployment:

- College Server for API and database hosting.
- SQL Server Management Studio for database administration.
- GitHub for version control and collaboration.

Development Stages

1. Building Game Pages:

- Implement login, role selection, and game board UI.

2. Integrating Firebase:

- Enable real-time multiplayer room management.
- Synchronize game state across players.

3. AI Implementation:

- Integrate GPT for generating Spymaster hints.
- Use Word Embedding for AI-driven word guessing.
- Adjust difficulty levels based on AI capabilities.

4. User Experience Enhancements & Testing:

- Conduct functionality tests.
- Improve UI/UX with animations and interactive elements.
- Perform performance optimizations and bug fixes.

Summary

- 'AI-Powered Codenames Game' is a real-time multiplayer strategy game integrating AI for clue generation and word guessing.
- The system is built using ASP.NET Core, Firebase, and SQL Server.
- OpenAI and Word Embedding enhance the AI capabilities.
- Firebase ensures smooth real-time gameplay for multiple players.
- The game is hosted on the college server for reliability and security.