WOMANIUM HACKATHON 2022

Quantum Maze

Humans vs Quantum Computers (IBM)

Introduction

Team Name: Quantum Maniacs

Challenge Name: Humans vs Quantum Computers (IBM)

Pitch Presenter: Hanzi Li

Team discord server: Womanium Hackathon team

Member Names:

- **Abdullah Kazi**
  Discord ID: K🐺#8200
  GitHub ID: AbdullahKazi500
  eMail: *kazi.abdullah.temea66@gmail.com*
- **Afrah Aamer**
  Discord ID: alastine#5191
  GitHub ID: AfrahAamer
  eMail: *afrahaamer@gmail.com*
- **Hanzi Li**
  Discord ID: hanzili#4885
  GitHub ID: hanzili
  eMail: *hanzili0217@gmail.com*
- **Raymundo Vazquez**
  Discord ID: Raymundo21#2210
  GitHub ID: Raymundv
  eMail: *gusvazra@student.gu.se*
- **Shanice St John**
  Discord ID: Shan#4498
  eMail: *thebutterflymaze@gmail.com*
- **Sri Sowmya Tirukkovalluri**
  Discord ID: srisowmya_tirukkovalluri#1409
  GitHub ID: Sowmyat1
  eMail: *tsrisowmya@gmail.com*

Game Summary

Mission:

We have developed a Quantum Game " Quantum Maze" using IBM Qiskit and Godot. Our Aim is to introduce the players to the world of Quantum Computation. Quantum Maze helps the players to learn about Qubits, Quantum gates, Quantum Circuits, and Noise.

History of Quantum Games:

Early history of computer games dates as far back as the history of digital computers. In 1950 one of the first games on computers, Bertie the Brain, was exhibited in the Canadian National Exhibition . Its main purpose was to demonstrate the use of vacuum tubes (and light bulbs), and it did it by playing Tic-tac-toe. In 1951 Nimrod played the game Nim, again using vacuum tubes and light bulbs. There the purpose for developing a game for a computer was more of an educational kind, as it illustrated the then seemingly strange idea of programming principles and algorithms One of the earliest if not the first commercial game bearing the word "quantum" in its title was called Quantum produced for Atari in 1982. There you enter a subatomic world to capture particles using optical trackball included in the game

Story :

In the Quantum world, your worst enemy is Noise. When the qubits interact with the noise it results in an uncontrollable change in the quantum states and causes a loss of information stored by the quantum computer. Your mission is to help the qubit to achieve a given target state by passing through a certain set of quantum gates and also avoiding the noise balls which are scattered around the maze.

Survival Tip: Be careful of noise balls, they are very powerful and can kill your quantum state with just one touch!

How To Play:

1. Move the ball through the blocks. Each block represents a quantum gate.
2. Use the keypad to move through the maze.
3. You must avoid the noise objects, otherwise, you'll lose the game.
4. Watch the Gameplay/Walkthrough

How to Install

Challenges Faced

- Since there is never been a quantum game which was developed using Godot. We ran into a lot of roadblocks trying our quantum game using Godot.
- We found that there were many qiskit packages such as the *qiskit.visualization d*oesn't work on Godot. So we only had access to limited qiskit resources.

Software & Tools Used

- Qiskit
- Godot
- LaTex
- GitHub

Future Plans

1. Add more levels to introduce more quantum gates and different types of noise obstacles to the game.
2. Introduce more quantum computing concepts eg. Entanglement, Quantum Tunneling, etc.
3. Introduce more graphics and animations in the Game
4. Introduce multiple qubits to the game.
5. Introduce error correcting codes to the game which can help the player restore the state of qubit after they come in contact with the noise balls.
6. Introduce engaging characters for the game storyline. Represent them as Qubits, state 0 being a bad person, and state 1 a good character. Through life experiences(quantum gates), the character chooses and affects its inner state, and then after a measurement (situation) decides to be either bad or good.
7. Introduce engaging characters for the game storyline.
8. Represent them as Qubits, state 0 being a bad person, and state 1 a good character. Through life experiences(quantum gates), the character chooses and affects its inner state, and then after a measurement (situation) decides to be either bad or good.

License

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