Pucket: An Innovative Twist on a Classic Game

Submitted by:

- Hamaiz Siddiqui (22k-4682)

- Abdul Wadood (22k-4764)

- Zeerak Shahzad (22k-4692)

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Instructor: Ms. Mehak Mazhar

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1. Introduction

Pucket is a traditional, fast-paced tabletop game where players use elastic bands to launch pucks through a small hole into their opponent's side. In our AI course project, we reimagined this game in a digital environment using Python and Pygame. Our implementation adds a layer of strategy by introducing an AI opponent and realistic physics simulation.

2. Project Objectives

The primary objectives were to replicate the game digitally, implement a strategic AI opponent, simulate realistic physics, and prepare for advanced game features.

3. Gameplay Overview

Players take turns launching pucks into the opponent's goal. The player with all pucks scored first wins. The AI calculates its moves automatically.

4. Technical Details

Technology Stack: Python 3.x, Pygame

Game Engine: Includes rendering, input, physics, turn logic

AI System: Randomized strategy, target prediction, future upgrades planned.

5. Key Features Implemented

- Turn-Based Play

- AI Opponent

- Scoring System

- Physics Engine

- Debug Mode

- User Interface

6. How to Play

Requirements: Python 3.x, Pygame

Run: python game.py

Controls: Mouse (aim & launch), Tab (switch puck), F3 (debug), R (restart)

7. Implementation Highlights

Physics: Friction, elastic collisions, goal detection

AI: Targets goal with slight randomness

Code: Organized into Puck, Player, Game classes

8. Development Timeline

Week 1–2: Concept & Rules

Week 3–4: AI Planning

Week 5–6: Mechanics & Physics

Week 7: AI Integration

Week 8: Testing & Documentation

9. Planned Future Enhancements

- Power-Ups

- Obstacles

- Advanced AI

- Difficulty Levels

- Multiplayer Mode

10. Challenges and Learnings

Challenges: Accurate collision detection, turn timing

Learnings: Game theory, 2D physics, game state management

11. Conclusion

The project successfully implemented an engaging AI-driven version of Pucket. It sets the stage for future enhancements and demonstrates effective application of AI and game development principles.

12. References

1. Sutton, R. & Barto, A. (2018). Reinforcement Learning

2. Harris, C. & Wang, Y. (2021). Game Theory

3. Pygame Docs: https://www.pygame.org/docs/