CS101 Project 2015

AIR HOCKEY

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An Introduction to the Game

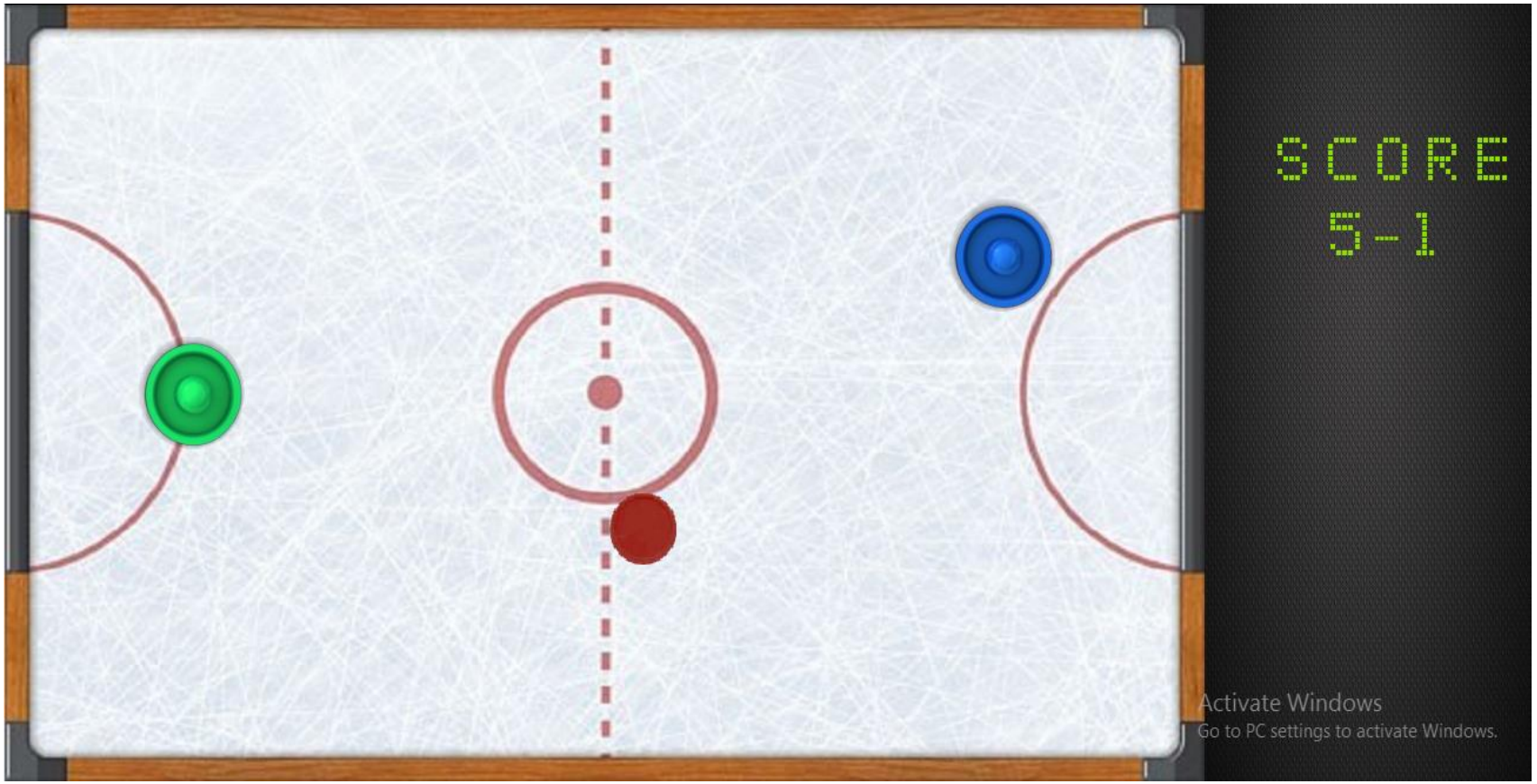
Air hockey is a game for two competing players trying to score points in the opposing player's goal using a table having a special low-friction playing surface.

Air hockey table consists of large smooth playing surface, a surrounding rail to prevent the puck and mallets from leaving the table, and slots in the rail at either end of the table that serve as goals.

Abbreviation used in the game

- Mallet:. In our game the mallet is a circular disc like structure that user controls using the mouse while the computer controls using AI.
- Puck:- It is a circular disc that user and computer hits using the mallet to score goals.
- Goal:-Situation when a player wins a points by hiting the puck inside a definite box of the opponent.

SCREENSHOTS



Problem Statement

- The aim of the project is to build a software version of the game with fluid and visually appealing graphics .
- The game will be having artificial intelligence to play as opponent and collision function along with vector and scoring functions.

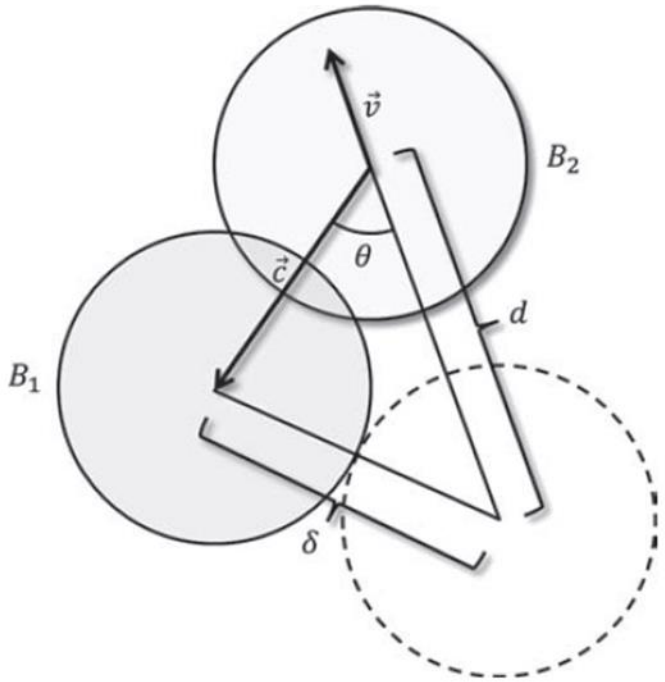
SCREENSHOTS

SCREENSHOTS

Challenges

- The first and foremost problem we faced was writing proper collision equation .
- Sometimes the two circles intrude into each other due to high velocities .
- At particularly high velocities the puck crosses over the mallet without bouncing off.
- The solution to this ,is overcome by using **proper collision dynamics** and **the concept of interpolation of frames**.

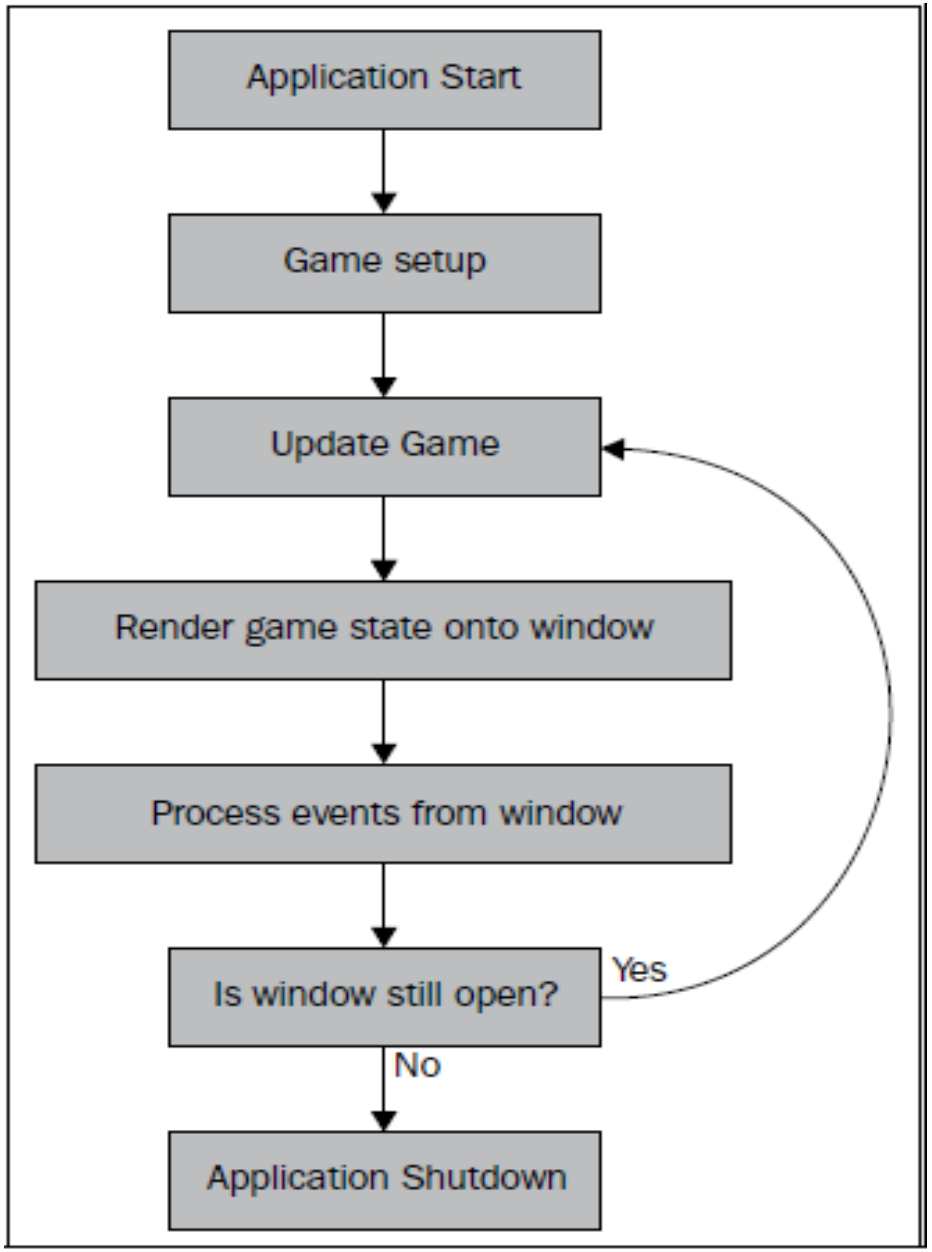
Challenges



Challenges

- Initially the game was lagging due to unarranged code
- It was difficult to arrange in such a way so as to make the game time efficient
- Thus we came up to following method

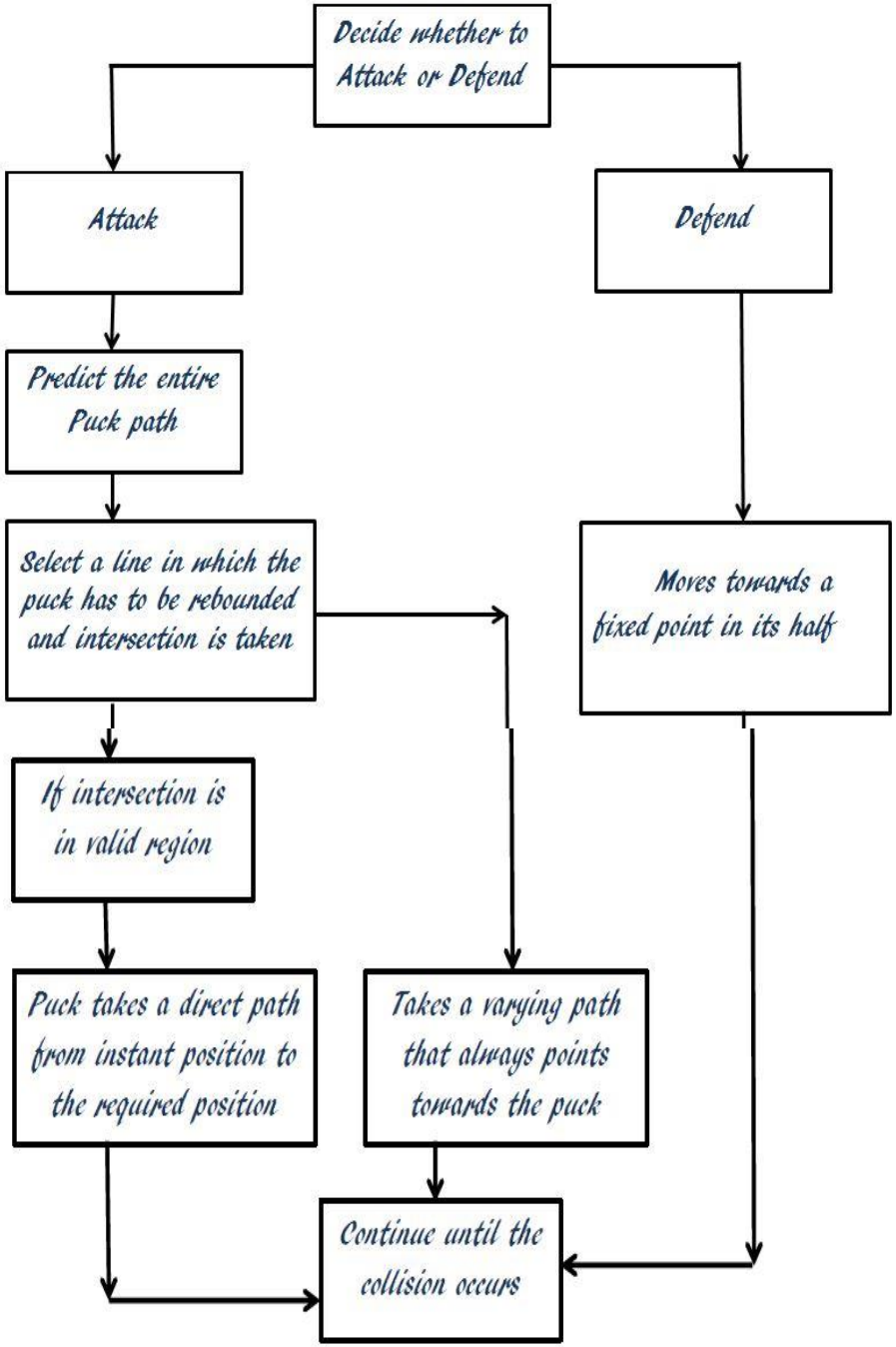
Challenges


Application Start
Game setup
Update Game
Render game state onto window
Process events from window
Is window still open?
Yes
No
Application Shutdown

Challenges

The artificial intelligence (AI) function itself was a challenge. Like:

- Making the AI algorithm difficult to beat and equally defeatable
- Integrating the AI with main program and interface
- To confine the computer mallet within the boundary condition by taking care of all the collision
- To find the intersection point by considering all the collision between the wall and puck


Decide whether to Attack or Defend
Attack
Defend
Predict the entire Puck path
Select a line in which the puck has to be rebounded and intersection is taken
Moves towards a fixed point in its half
If intersection is in valid region
Puck takes a direct path from instant position to the required position
Takes a varying path that always points towards the puck
Continue until the collision occurs

Innovations

- The interface was a made a bit more helpful and user-friendly
- The win or lose result screens add fun to the game
- The AI algorithm was also a bit changed to add randomness and make it beatable

Future Work

- Concept of air hockey can be developed to convert it into multiplayer football game.
- Inclusion of tournament modes with increasingly level of difficulty.
- Multiplayer version of the game using LAN connections.
- May be developed to play online matches.
- Using of boosters during the game such as powerbooster to give an extremely powerful shots.
- User controlling of colours of mallets and puck.

Thank You!