AIR HOCKEY

CS-154 PROJECT

Team Members

170050022 Arpit Aggrawal

170050025 Yash Khemchandani

170050060 Tushar Agarwal

Problem Statement-

To implement an one player Air Hockey game with a bot striker which displays human like behaviour, i.e. , your chances of scoring depends on the speed and placement of your strike.

Design-

The game is implemented in 2htdp universe with a variable state which stores the position and velocity of the player-striker, puck and bot-striker.

Puck moves due to elastic collision with the walls of air hockey table and inelastic collisions with the strikers. The position of puck is updated at every time-tick in accordance with its velocity.

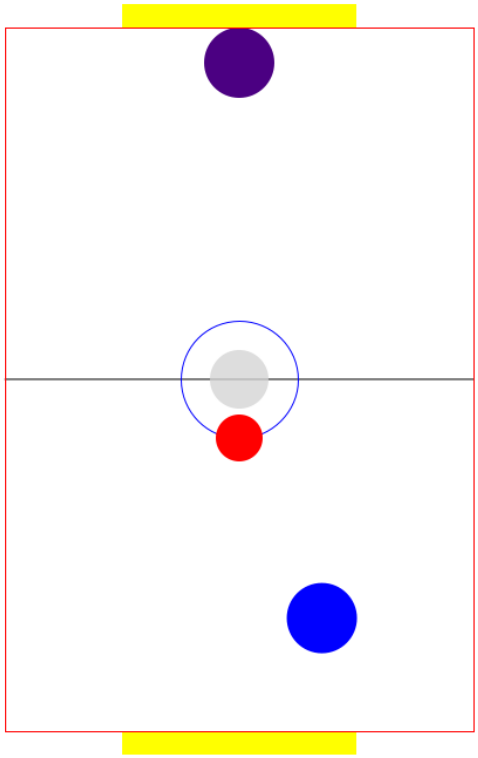
Player striker moves solely on the basis of mouse movement, with the constraint of limiting it to bottom half of the table.

The Artifical Intelligence Bot in our program makes extensive of 2-D Co-ordinate Geometry in order to analyse the path of the puck and in turn determining what its next move will be. From reflections of line, to equation solving and thus analysing the situations are the key aspects of our AI Bot. Also it applies various strategies depending on the velocity of the puck and thus mimicking the reaction time in humans, being an easy move if velocity of the puck is less and a hard one if the velocity of the puck is more. The Bot also has a maximum velocity which acts as his limitation and gives the chance to the player to score.

Input/Output

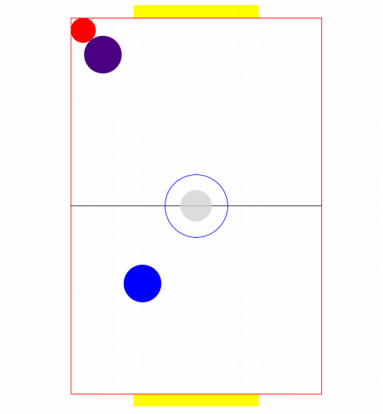
Input is in form of mouse movement determining the position of the player-striker.

Output is in form of update in position of puck and bot striker.



Limitations/bugs

- Defensive strategy of bot-striker fails at times especially when the puck comes toward the striker from behind.
- Update isn’t continuous but in ticks which leads to objects going out of frame at times.
- Bot-striker movements can be made more human-like by introducing some randomising functions in its movement.



Highlights

- AI implemented for the bot striker is completely based on geometrical functions which determines its velocity and position so that it can score.
- You can score only if you place and speed up your shots well, as the bot won’t be able to reach out for it, which resembles to the natural human game.
- The program uses states, mathematical and physical operations in very effective way.