X.X. AI

Main concept of in game AI is in using different tactics for current situation in match. According to absolute and relative positions of puck and xeno discs on rink, match score, time and other parameters CPU player (or AI player) will behave in some manner. This behavior we will call tactics.

All tactics will fall in two categories: offensive and defensive. Main goal of offensive tactics is to score in human player goals. Opposite of this, defensive tactics targeted to prevent the player doing the same with CPU goals.

Offensive tactics:

- Hit'n'Run
- Bordering
- Middlefield
- Pressing

Defensive tactics:

- Ejection
- Tackling
- Goalkeeping
- Time consuming
- Defensive Pressing

Tactics overview.

This section is describing in detail how CPU player supposed to behave then executing different tactics. Also it gives instructions then different tactics come in play.

Hit'n'Run.

This is simplest offensive tactics. CPU player will push puck toward human player goals. If position is not allowing this, e.g. CPU disc is to the right of player goals and the puck is also to the right of CPU disc, then CPU player must move disc in position allowing hitting puck in needed direction. No defensive action is taken.

This tactics can be executed then puck positioned in middle field (center part of rink) or in offensive side of rink (part of field there player goals are).

Bordering.

This offensive tactics heavily rely on rink configuration and try to fake player. CPU player will try to score by using trick shots. The puck will be hit in such way that it will be reflected by borders of rink and will be directed in player goals. This is must be accompanied by feint: half of time take to aim shot CPU player must emulate fake shot (e.g. straight hit in goals), that player will possibly try to counter. Then CPU must rearrange his shot to perform reflection shot and try to score.

This tactics can be executed then puck positioned in offensive side and player disc is between player goals and puck.

Middle field.

This offensive tactics is dictating CPU player to stay in center part of field in such manner that human player can't see CPU disc, as if it will be out of camera view. Then player try to eject puck from his defensive side CPU will counter puck with one single strong hit that would deliver puck to goals. Player must be surprised by this hit.

This tactics can be executed then puck and human player disc positioned in offensive side. CPU player disc should be on defensive side or in middle field. Also there should be draw state of match or CPU lead against player.

Pressing.

This offensive tactics is based on trick used in many team sports. CPU player should behave as pesky dog and try to stick to human player disc. He must be in close vicinity to player but between player disc and CPU goals. Such position will give a good chance to counter player hit and direct puck in direction of player goals.

This tactics can be executed then puck and human player disc positioned in offensive side. CPU player disc should be on defensive side or in middle field. Also there should be draw state of match or CPU loosing against player with some difference (e.g. zero to two or one to four). Also time to the end of match (or period) is important factor. In real world sports pressing is often used in endings of game intervals.

Ejection.

This is simplest defensive tactics. CPU player will push puck outward his goals. Best result if puck is evacuated from defensive side of rink (part of field there CPU player goals are) to the middle field or offensive side. In some situations similar to Hit'n'Run tactics CPU player beforehand must move his disc in right position to accomplish this.

This tactics can be executed then puck positioned in defensive side.

Tackling

This defensive tactics is bright example of counter trick. Then human player tries to make hit in CPU goals CPU player quickly must throw his disc to send puck back to middle field or even offensive side.

This tactics can be executed when CPU player disc positioned in defensive side and human player is in middle field and the puck is between both discs. Range between discs must be greater then two or three sizes of xeno disc (because super reaction for CPU cannot be allowed, it's not very fair).

Goalkeeping.

This defensive tactics dictates CPU player to stay in close vicinity to his goals and make saves. By this human player chances to score decreases greatly. "Save" mean movement of disc that will reflect puck sliding right away in goals. Reflected puck may even stay in defensive side, CPU will stay near his goals anyway.

This tactics can be executed then CPU player has big advantage in score. CPU disc must be situated in defensive side.

Time consuming.

This defensive tactics mean that CPU player will hit puck with very little strength and even in direction of his own goals. Main goal is to put CPU player disc between puck and human player disc and by this preventing the puck being even touched by human player. Best if this is done near borders of rink (hiding puck in corner of rink would be perfect decision).

This tactics can be executed then match is draw or CPU leads. Also more than a half of match time must be spent already.

Defensive pressing.

Idea for this is very similar to offensive tactics Pressing, but goal of this tactics is to push puck away from defensive side.

In each discrete time moment CPU player is executing only one tactics. During iteration of game cycle he can change tactics according to game situation. This situation is defined by next parameters.

Important game parameters:

- Position of puck relative to field (in offensive side, in middle field, in defensive side)

- Position of puck relative to players (between them, to left of both, to right of both)

- Absolute position of puck on field (proximity to borders, corners or goals)

- Difference in match score

- Time spent in match.

- AI level (better the level of AI play – simplest tactics are used less often, advanced tactics are come in play more often)

Summary

This AI player should provide enough level of competitive and interesting gameplay. Possible suggesting for realization is Finite State Machine. Also using Fuzzy Logic techniques is recommended.

Note: two AI players can be executed in demo mode of the game.