BLACK JACK Learning Program

USF UNIVERSITY OF SOUTH FLORIDA COLLEGE OF ENGINEERING

System Description

1. Save past experiences to a file.

The file that the agent saves contains three columns and an unlimited number of rows. The formatting is described here

VAL_CARDS	PREV_DECISION	RESULT
<...>	<...>	<...>

Where VAL_CARDS is the value of the hand at the time a decision is made, PREV_DECISION is whether or not the agent chose to hit (1 if hit, 0 if stand), and RESULT is the result of the agent's decision (1 if win, 0 if loss, -1 if not a loss or draw).

2. Uses past experiences to create a knowledge table.

The variables in the table are as follows:

VAL_CARDS is as in the past experiences table; NOLOSS_IF_HIT is the chance that the agent will not lose if he chooses to take a hit; NOLOSS_IF_STAND is the chance that the agent will not lose if he chooses to stand; ERR_HIT is the margin of error in the NOLOSS_IF_HIT column; and ERR_STAND is the error in the NOLOSS_IF_STAND column.

3. Uses the knowledge table to make decisions.

The agent will use the knowledge table to determine whether to hit or stand when its cards are of a specific value. In particular, if the chance of not losing when accepting a hit is greater than the chance of not losing when standing, the agent will *normally* try to accept a hit. If the opposite is true, the agent will *normally* stand. There is, however, gray-area in the decision-making process: Suppose that the agent has a hand valued at 15, that NOLOSS_IF_HIT is 0.75 and NOLOSS_IF_STAND is .667. If the margin of error columns contain large numbers, agent will not always choose to accept a hit, though it "knows" that it is a better decision. This is done to ensure that the data does not become skewed easily, showing higher or lower probabilities than it ought.

Inexperienced AI

Wins	Draws	Loses	Win Rate
141	11	348	0.30
125	7	368	0.26
133	7	360	0.28
141	4	355	0.29
129	6	365	0.27

Experienced AI

Wins	Draws	Loses	Win Rate
217	37	246	0.51
215	41	244	0.51
221	44	235	0.51
222	40	238	0.52
214	45	241	0.52