POKER

-by

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- **Introduction**

This is a interim report for developing two-player Poker game in C .It explores the concept of Artificial Intelligence in games such as state-space tree and minimax algorithm.

- **Aim**

The aim of this project is to create an efficient, smart Poker program. This Poker program is a computer program designed to play the game of poker against other computer players.

Poker is a game of incomplete information, which makes predicting the final result and value of the hand possible. This gives a perfect opportunity to implement some of the Artificial Intelligence concepts.

- **Overview**

Poker is a game of cards in which two players are given equal amount of coins. The player who is left with 0 coins looses the game and the player who ends up with double of his amount at the start, wins the game.

Two cards are distributed to each player and five cards are placed on the table face down.

Cards on the table are opened in three steps.

In the first step ,both the players put 5 coins in the pot. Then the first three cards on the table are disclosed.

The first step is called Flop. Both the players put 5 coins in the pot. Then the first three cards on the table are disclosed.

In the second step, called Turn both the players put 10 coins in the pot. Then the fourth card on the table is disclosed.

Finally, in the third step River, both the players put 15 coins in the pot. Then the fifth card on the table is disclosed.

Two cards of each player are replaced with any of the two cards of the five cards on the table.

Player having the pair of cards which forms the highest winning combination wins the round and gets all the coin from the pot.

Player can fold the card before Turn and River, in which case the other player wins the pot getting all the coins present in the pot.

- **Goals**

First goal is to develop a program versus program poker game.
After this goal, one of the program is enhanced to address the AI issue of look-ahead. The program would predict the chances of winning by forming a state-space tree and using a minimax algorithm which would return a utility value. If the utility value is less than threshold value the program will fold the card and start with next round.

An static evaluation function, is a function used by game-playing programs to estimate the value or goodness of a position in the minimax algorithms.

For the game of poker, the static evaluation function can be the difference between the highest rank of winning combination possible with the two cards of the player and highest rank of winning combination possible with the any two cards, apart from the cards opened on table and the player's card.

A minimax algorithm is a recursive algorithm for choosing the next move in an n-player game, usually a two-player game. Each position/status of the game is evaluated by using a static evaluation function and the resulted value indicates how good or bad it would be for a player to reach that position.

- **Background**

Pokerlisting website was used to know the rules. It helped me to know the ranks of the winning combinations.

To know the flow of the poker number of games were played on Zynga Poker.

Introduction to Artificial Intelligence by Rusell and Norvig is being used to implement the AI concepts of State-space tree, minimax algorithm, static-evaluation function.

- **Implementation and Status**

I have used C language to implement the project.

I have completed goal 1 of developing a program competing with a program to play the game of poker at the same level.

I would take one of the program a level further in which it can form a state space tree at FLOP and TURN steps.

Minimax algorithm would be used to find the future possible combinations of itself and the opponent and the values would backup to give a utility value.

This utility value would help the program to decide whether to continue to play the current round of game or to fold early and start with the next round of game without losing extra coins.

- **References**

1) http://cowboyprogramming.com/2007/01/04/programming-poker-ai/

2) http://www.pokerlistings.com/poker-rules

3)Artificial Intelligence -A Modern Approach