**Proposal for CIE6023(MDS6232) Final Project 2021**

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**Title:** A Solution to China Competitive Poker Using Deep Learning with Computer Generated Training Examples

**Description:**

China Competitive Poker (CCP), also known as “Dou Dizhu,” is a very popular poker game across the country. As the popularity of CCP continuous to grow, related algorithms also emerge. The research by Liu, Hu, and Zhang applies convolutional neural network (CNN) to solve the problem of CCP with training examples drawn from real games played by human experts (Liu, Hu and Zhang 2018). However, since the training examples in such study are real games played by human beings, the trained network can only “imitate” the behaviors of humans instead of beats human beings.

Therefore, we want to change the source of training examples from “real” games to “computer-generated (CG)” games. In real games, players only have the information of their own cards in hand as well as the cards that are already played out. Therefore, the real CCP game is “imperfect information game” indicating that each move of a real person may not be the actual “best” move. Such bias may reduce the win rate of the trained network. In our CG games, we assume that each player has “perfect” information of the game – not only the cards in their hands but also the cards of other players. Under this assumption, we therefore are able to use such search algorithms such as Minimax to find the “best” move for each player and thus obtain an “unbiased” training set.

* **Task and goal**

Use computer to generate “unbiased” training examples and construct a convolutional neural network to achieve a CCP AI with high win rate.

* **Dataset and experiment**

Computer-generated dataset, split randomly into training and test set.

* **Expected results**

The trained neural network can correctly predict the computer-generated “best move” under the circumstance of imperfect information and has a higher win rate than actual human beings.

**Tentative Timeline/To-do lists:**

* Apr 5 – Apr 11: Investigation
* Apr 12 – Apr 18: generate dataset
* Apr 19 – Apr 25: construct CNN
* Apr 26 – May 2: experiments
* May 3 – May 9: paper writing

**Reference**

Liu Z, Hu M, Zhang Z. A Solution to China Competitive Poker Using Deep Learning[J]. 2018.