Implementing neural networks with tensorflow report

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Abstract

The aim of this project is to create a virtual Texas Hold'em player by using a convolutional neural network, based on the paper "Poker-CNN: a pattern learning strategy for making draws and bets in poker games" [1] by Yakovenko, Nikolai et. al. The aim is to imitate human poker-playing behaviour, including bluffing, as close as possible - a task where current, non neural network based poker bots usually fail.

1 Introduction

Unlike other games such as chess or checkers, poker provides an especially challenging task for computer players (bots). That is because poker contains a very "human" component aside from its set of rules: the bidding, raising, the bluffing. Where other games only provide a reward upon successfully winning them, the reward itself is a key element of the poker turn structure. Furthermore, since Texas Hold'em poker can be played with up to 9 people at a regular game, the state space grows to an enormous size. All these factors lead to the fact that current bot implementations usually are rather weak. Confronted with a human player, these bots have the huge disadvantage of being predictable: They often show repetitive behaviour and are bad at bluffing [CITATION NEEDED, genaue player anfhren]. Due to these barriers, the team of Yakovenko, Nikolai et. al. developed a CNN based approach that aims at surpassing the current implementations and even competing with human tournament players [1]. As their data source, they used simple bots to generate a large training and validation set. Learning only from the successful games, the CNN should afterwards be easily able to surpass the weak bots.

2 The paper

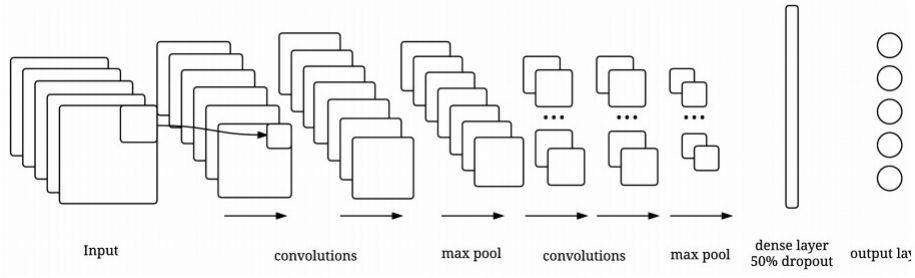
2.1 Original

2.2 Our changes

3 The CNN architecture

The convolutional neural network that was used within this project has an architecture similar to the original CNN from the paper[1]. The input data is formatted as a 17x17x9 3-dimensional tensor, including all blablablubb [Wie zum Geier sieht denn nun unser Format eig. aus?]

Figure 1: Network structure



Bibliography

[1] Yakovenko, Nikolai, et al., *Poker-CNN: a pattern learning strategy for making draws and bets in poker games*, arXiv preprint arXiv:1509.06731 (2015).