**Project Web Page:**

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Duration: One semester

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Semester: WINTER

Project Year: 2020

Categories: Machine Learning

Project Name: **solving Sudoku using machine learning and AI tools**

The Sudoku game is a number placement puzzle that gained popularity in newspapers and among the public in the last few years. In parallel, machine learning algorithms have gained massive popularity also. One way to solve Sudoku automatically is with brute-force algorithm, and trying every possible solution using a backtracking algorithm. The problem with this method is that it is very time consuming and has high complexity. In this project we solved this problem by using a deep learning algorithm, which on one hand is less time consuming in test time, but on the other hand demands a big database of Sudoku puzzles. We applied different deep learning algorithms and different training methods to solve this problem in the best and most efficient way. Among the solutions we attempted, we received the best result by using a Fully Connected network (FC). We found that the best way to solve the puzzle is by using an iterative method which we will expand on later. Moreover, we concluded which is the best way to delete numbers from the Sudoku puzzles during the training process. In addition, we compared the running time between the network we designed to the backtracking algorithm's running time, and we saw that the network's average running time was indeed faster.

