

# Report for Project Go

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## 1. Preliminaries

I am going to implement two basic rules[1] of go, one is the chess with no liberties cannot exist on the board, the second is the player cannot go to the position with no liberties except make its opponent no liberties and remove it. I use Python to implement what I mentioned in codes, and use package numpy to operate data and tkinter to give a GUI feedback. The basic search concept is depth first search.

## 2. Methodology

- **read\_go:** read chess board from file.
- **plot\_go:** transform the chess board matrix into GUI form.
- **is\_alive:** start from given position and search adjacent position with the same color to check whether besides blank position.
- **near\_none:** check whether the given position near a blank position.
- **next\_on\_board:** check whether the specific direction of the position is available.
- **go\_judge:** Black and white invoke **is\_dead** respectively, and check whether the whole chess board obey the rule.
- **is\_dead:** check whether the specific color is dead on the whole board.
- **which\_dead:** return all the dead chess of the specific color.
- **eat\_dead:** remove all the given dead chess.
- **user\_step\_eat:** return where to put one step forward for white chess pieces so that some black chess pieces will be killed, and **user\_arr** that the result chessboard after the step
- **user\_setp\_possible:** return all the possible locations to put one step forward for white chess pieces

In a given position, a liberty of a stone is an empty intersection adjacent to that stone or adjacent to a stone which is connected to that stone. (After playing their stone) a player removes from the board any stones of their opponent's color that have no

liberties . If the start chess and its neighbor chess with the same color are surrounded by the opponent's color without space, it means dead.

### **3. Empirical Verification**

- Add functions to check the specific color is dead or not, if near a blank position, if out of board, etc.
- Using given data training and testing, I get the exactly the same output as the answer.

### **4. References**

[1] Usgo.org. (2017). *The Rules of Go*. [online] Available at: <http://www.usgo.org/rules-go> [Accessed 2 Oct. 2017].