Project proposal: Comparative exploration of old and modern AI Methods with Abalone

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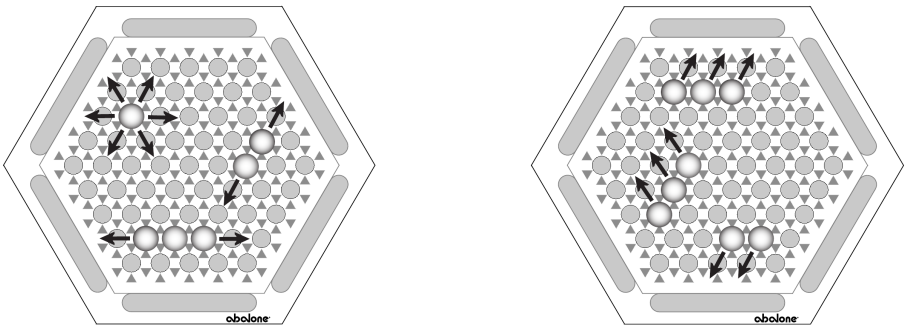
Abstract. Keywords: AI · Alpha-beta · Q-Learning · Abalone · Intelligent Agents

1 Introduction

Abalone is a fairly new game, that was devised in 1987 by Michel Lalet and Laurent Lévi [1]. It is a two-player game Based on the [2]



(a) "In-line" moves (b) "Side-step" moves

Fig. 1: Basic moves [3]

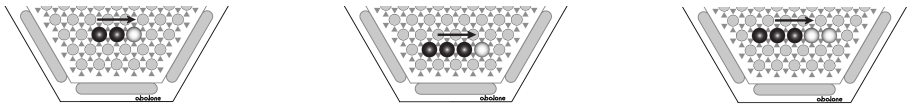
1.1 Rules

1.2 Complexity

State space complexity

$$\sum_{k=8}^{14} \sum_{m=9}^{14} \frac{61!}{k!(61-k)!} \times \frac{(61-k)!}{m!((61-k)-m)!}$$

Game tree complexity



(a) "2-push-1" sumito (b) "3-push-1" sumito (c) "3-push-2" sumito

Fig. 2: Sumito positions allow pushing the opponents marbles [3]

Comparative complexity

2 Project details

2.1 Agent design

2.2 Algorithm comparision

2.3

3 Conclusion

References

1. Abalone (board game). Wikipedia (Dec 2020)
2. Russell, S., Norvig, P.: Artificial Intelligence: A Modern Approach. Pearson Education, Inc, fourth edn. (2021)
3. S.A., A.: Abalone rulebook. https://cdn.1j1ju.com/medias/c2/b0/3a-abalone-rulebook.pdf