Winning The Chalkdust Coin Game (And Other Games)

Alex Bolton

November 11, 2017

AlphaGo

Figure: A completed game of Go.

AlphaGo

- Google's AlphaGo used state-of-the-art machine learning and computational power to beat Lee Sedol.
- One feature was that AlphaGo played to win, not to maximise its score.

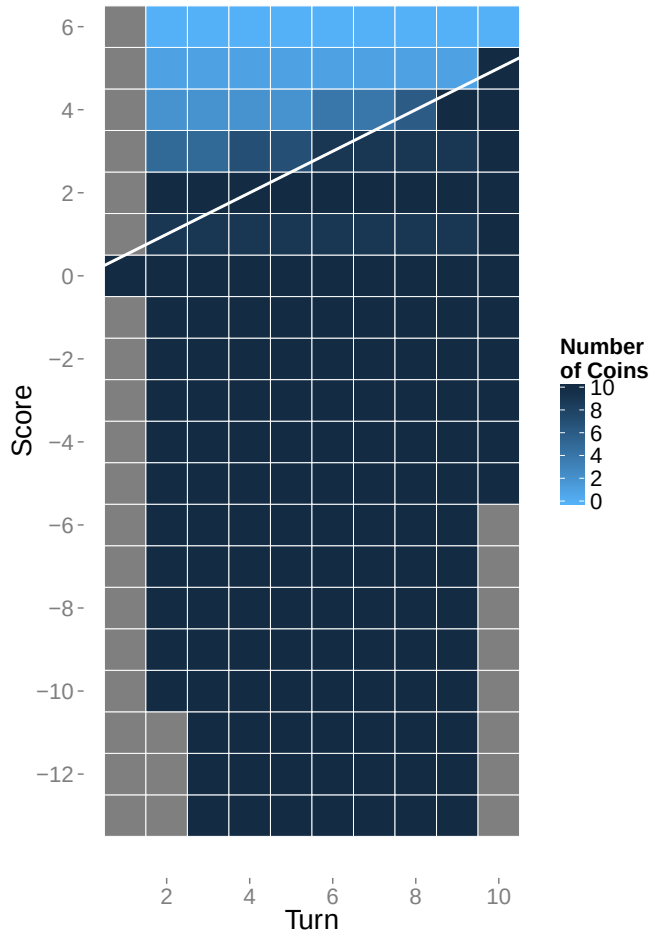
Play To Win, Not To Maximise Your Expected Score

- If the result of a game is win/lose then the margin of victory/defeat is not important.
- A common mistake is to play to maximise expected score.
- If you are in the lead, avoid risk.
- If you are losing, take risks to improve your chances.

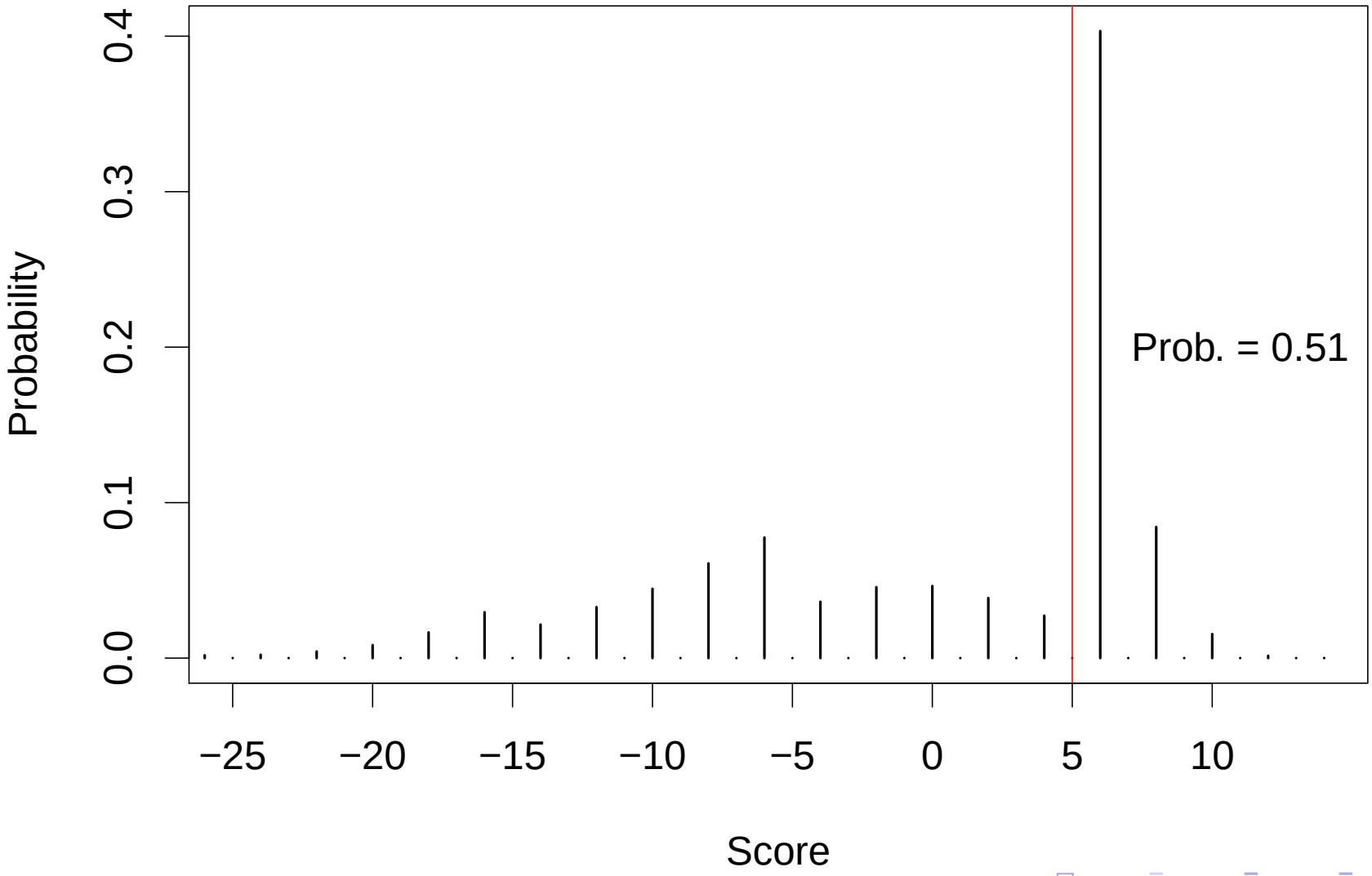
Chalkdust Coin Game

- Game played over 10 turns.
- Each turn you choose a number of fair coins to flip that turn, up to a maximum of 10 (you can choose to flip none).
- You flip some coins, then you add the number of heads minus the number of tails to your score.
- Your opponent's score increases by $\frac{1}{2}$ each turn, so will be 5 at the end of 10 turns.
- A recursive formula gives the optimal strategy.

Chalkdust Coin Game



Chalkdust Coin Game



Summary

- If you're behind, gamble!
- Applicable in real life?