
Insert Title of Paper Here

Matthew Faulkner

Jon Krause

Daniel Rosenberg

Abstract

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1 Background

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2 Algorithms

2.1 Discretization Algorithms

The simplest approach that one can take when tackling an infinite number of arms is to merely pick out some finite number of arms and run a standard finite-armed bandit algorithm on them. This raises the following questions:

- How many arms should be chosen?
- How should the arms be chosen?

The answer to the first question is algorithm- and problem-specific. For example, consider the case where the reward function $r(x) = x$ defined on the interval $[0, 1]$. With no noise, the ϵ -greedy strategy will converge to the correct arm immediately after sampling each arm once, and thus it



Figure 1: Here we see a many armed bandit.

is beneficial to choose a very large number of arms. A UCB1 or Exp3 strategy, though, will take significantly longer to converge, so if convergence time is an issue, perhaps fewer arms should be chosen at the expense of some accuracy.

Concerning how the arms themselves are chosen, two obvious strategies are to either choose them randomly or to choose them in a grid (at regular intervals in the 1D case). Choosing the arms in a deterministic way means that, for a fixed number of arms, we can construct a reward function that makes the algorithm behave terribly. Even given an arbitrary number of arms, by choosing a reward function with a maximum near an endpoint of an interval in \mathbb{R} , for example, we can ensure that the algorithm would never do too well. For these reasons, we opt to go with a random choice of arms.

In any case, merely discretizing the domain into a finite number of arms introduces a bias, as our effective hypothesis class (each of the arms) probably no longer contains the optimal hypothesis.

2.2 Zooming Algorithm

Some very informative text

2.3 Hierarchical Optimistic Optimization

Some very informative text

3 Artificial data decription

Real data? who needs it?

4 Possible Applications

Apparently us.

5 Conclusion

In conclusion, we did some stuff, and will do more.

6 Future Work

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References

[1] hkjlh