Multi-Armed Bandits for Optimizing New Peers in Peer-to-Peer Networks

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Abstract

Write this last (fewer than 300 words). The completed document should be 5-9 pages.

1. Introduction

Introduction here. Problem, why it is important/interesting, and the plan for the approach.

2. Related Work

Example of related work section. Discuss relevant literature. (Vermorel & Mohri, 2005)

3. Problem Formulation

Consider the setting of a peer-to-peer network wherein a new peer joins with the intent to be brought ”up to speed” with the rest of the network as soon as possible (i.e. download all the data in the network from other peers). However, the new peer does not know the network speeds of its seeds, just how much data it receives over time when it chooses a peer and receives data from them for one time step. The reward is how many bytes received in that time slot.

We want to be careful about defining the reward, because we want the agent to choose the peer that is transmitting the fastest. However, consider that network speeds may change, and the optimal seed to leech from will not always be the best.

4. Approach

Algorithms we will use and develop (e.g. eps-greedy, UCB, and more). Implementation details, pseudocode here.

Various algorithms will be considered, starting with epsilon-greedy and UCB (upper confidence bound). More complex bandit algorithms are considered as well.

5. Results

Use of implementation to produce results. Graphs here.

6. Discussion

Discussion on results. Pros and cons of suggested solution compared with existing solutions.

7. Conclusion and Future Research

What we learned. Future work, takeaways.

References

Vermorel, J. and Mohri, M. *Multi-armed Bandit Algorithms and Empirical Evaluation*, pp. 437–448. Machine Learning: ECML 2005. Springer Berlin Heidelberg, Berlin, Heidelberg, 1ère éd edition, 2005. ISBN 0302-9743.

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