Decision making regarding the 2-arm bandit problem

Hannah Chen hechen@eng.ucsd.edu
Sonali Rahagude srahagud@ucsd.edu
Sneha Venkatesh Yelimeli svyelime@eng.ucsd.edu
Chun Fan c9fan@ucsd.edu
Yashodhan Karandikar ykarandi@eng.ucsd.edu

Abstract

1 Introduction

1.1 Motivation

2-arm bandit problems, markov decision process

2 Background

2.1 Related Work

Shuannan's work

3 Design

3.1 Environments

3.2 Generation of Optimal data

3.2.1 Formulation of MDP

states definition, recursive formulation, decision rule

3.2.2 Algorithm

3.3 Inference of Parameters for Heuristics

For inferring parameters for different heuristic methods, we use the optimal data and do a grid search.

3.3.1 ϵ-greedy

3.3.2 ϵ-decreasing

3.3.3 Win Stay Loose Shift

3.3.4 τ-Switch

3.3.5 Common Algorithm Input : (alpha, beta, decisions, rewards), output: (parameter value)

Algorithm 1 LDA Generative process with collapsed Gibbs Sampling

Input: words $\boldsymbol{w} \in$ documents $\boldsymbol{d} \in [1, D]$

randomly initialize $\boldsymbol{z}$ and increment counters
for iteration $i \in [1, epoch]$ **do**
  for document $d \in [1, D]$ **do**
    for word $\in [1, N_d]$ **do**
      $topic \leftarrow z[word]$
      decrement counters according to document d, $topic$ and $word$
      for $k \in [1, K]$ **do**
        calculate $p(z = k|.)$ using Gibbs equation
      end for
      $newTopic \leftarrow$ sample from $p(z|.)$
      $z[word] \leftarrow newTopic$
      decrement counters according to document d, $newTopic$ and $word$
    end for
  end for
end for

4 Results

5 Optimal data

add table for decision vectors and reward vectors for different values of alpha, beta

6 Conclusions

A Appendix

References

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