

Projects for course on Markov chains MDA

Description and guidelines

Expected outcomes:

- A 5-page report which summarizes:
 - the main motivations and ideas of the paper, especially the problems/methods which are considered there
 - the main results and possibly their proofs
 - numerical experiments conducted yourself and/or in the paper (if applicable)
- If applicable, jupyter notebook and python codes to reproduce the experiments you have done
- A supplementary document you can refer to in the main report and where you can add whatever you think can be interesting for the examiner.

Guidelines

Below are guidelines on how to write-up your report for the final project. Of course, you can decide not to follow all these suggestions.

A "standard" report consists of the following sections:

1. Introduction

Motivate and abstractly describe the problem you are addressing and how you are addressing it. What is the problem? Why is it important? What is your basic approach? A short discussion of how it fits into related work in the area is also desirable. Summarize the basic results and conclusions that you will present.

2. Problem Definition, methodology (if applicable) and theoretical analysis

2.1 Task Definition

Precisely define the problem you are addressing. Elaborate on why this is an interesting and important problem.

2.2 Presentation of the Method (if applicable)

Describe in reasonable detail the methods the paper considers. A pseudocode description of the algorithm you are using is frequently useful. Trace through a concrete example, showing how the method processes this example. The example should be complex enough to illustrate all of the important aspects of the problem but simple enough to be easily understood. If possible, an intuitively meaningful example is better than one with meaningless symbols.

2.3 Main results and theoretical analysis

Provide here some formal theory and provide a brief overview of the analysis.

3. Experimental Evaluation (if applicable)

3.1 Methodology

What are the criteria you are using to evaluate your method? What specific hypotheses does your experiment test? Describe the experimental methodology that you used. What are the dependent and independent variables? What is the training/test data that was used, and why is it realistic or interesting? Exactly what performance data did you collect and how are you presenting and analyzing it? Comparisons to competing methods that address the same problem are particularly useful.

3.2 Results

Present the quantitative results of your experiments. Graphical data presentation such as graphs and histograms are frequently better than tables.

3.3 Discussion

Is your hypothesis supported? What conclusions do the results support about the strengths and weaknesses of your method compared to other methods? How can the results be explained in terms of the underlying properties of the algorithm?

4. Conclusion

If you have some place, suggest future research directions.