Mixtures of Partially Linear Models with Monotone Shape Constraints

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ABSTRACT

Please provide an abstract of no more than 300 words. Your abstract should explain the main contributions of your article, and should not contain any material that is not included in the main text.

Keywords: Mixture Models, Shape Constraints, Isotonic Regression

1 INTRODUCTION

Thanks for using Overleaf to write your article. Your introduction goes here! Some examples of commonly used commands and features are listed below, to help you get started.

2 AN OVERVIEW OF CONTRIBUTING MODELS

2.1 Mixture models

Guidelines can be included for standard research article sections, such as this one.

2.2 Partially Linear Models

2.3 Isotonic Regression

2.4 Past Work in Mixture Models with Monotone Shape Constraints

Hello

3 PROPOSED MODEL

Use section and subsection commands to organize your document. LaTeX handles all the formatting and numbering automatically. Use ref and label commands for cross-references.

3.1 Model Structure

3.2 Model Estimator

List steps of Algorithm here.

We are given

x — an $n \times p$ matrix (independent variables with no shape constraint)

z — an $n \times q$ matrix (independent variables with monotone shape constraint)

y — an $n \times 1$ matrix (dependent variable)

k — a positive integer representing the number of categories of latent variable L

$\mathscr{L}$ — an $n \times k$ matrix representing the posterior probability of observation $i = 1, \ldots, n$ belonging to latent category $j = 1, ..., k$. Additionally, for all $i = 1, ..., n$ and $j = 1, ..., k$, $\mathscr{L}_{ij}$ is a real number in the range $[0, 1]$, and $\sum_{j=1}^{k} \mathscr{L}_{ij} = 1$

1. For each i = 1,...n, set the vector $\mathscr{L}_i = [\mathscr{L}_{i1}, ..., \mathscr{L}_{ik}]$ as an instance of a multinomial distribution with k=k and n=1. I.e., randomly assign one of the vector elements of $[\mathscr{L}_{i1}, ..., \mathscr{L}_{ik}]$ to 1 and all other lik to 0, such that each $\mathscr{L}_i = [0, ..., 1, ..., 0]$ where 1 is at a random index.

2. In each iteration d until convergence:

    (a) M-step

        i. hello

    (b) E-step

        i. goodbye

4 SIMULATION STUDY

Compare to other algorithms here?

5 ANALYSIS OF LIFE EXPECTANCY DATA

6 DISCUSSION

6.1 Figures and Tables

Use the table and tabular commands for basic tables — see Table 1, for example. You can upload a figure (JPEG, PNG or PDF) using the project menu. To include it in your document, use the includegraphics command as in the code for Figure 1 below.

Figure 1. An example image of a frog.

Item	Quantity
Candles	4
Fork handles	?

Table 1. An example table.

6.2 Citations

LaTeX formats citations and references automatically using the bibliography records in your .bib file, which you can edit via the project menu. Use the cite command for an inline citation, like Lees-Miller et al. (2010), and the citep command for a citation in parentheses (Lees-Miller et al., 2010).

6.3 Mathematics

LaTeX is great at typesetting mathematics. Let $X_1, X_2, \ldots, X_n$ be a sequence of independent and identically distributed random variables with $\mathrm{E}[X_i] = \mu$ and $\mathrm{Var}[X_i] = \sigma^2 < \infty$, and let

$$S_n = \frac{X_1 + X_2 + \cdots + X_n}{n} = \frac{1}{n}\sum_{i}^{n} X_i$$

denote their mean. Then as n approaches infinity, the random variables $\sqrt{n}(S_n - \mu)$ converge in distribution to a normal $\mathcal{N}(0, \sigma^2)$.

6.4 Lists

You can make lists with automatic numbering ...

1. Like this,
2. and like this.

... or bullet points ...

- Like this,
- and like this.

... or with words and descriptions ...

Word Definition

Concept Explanation

Idea Text

ACKNOWLEDGMENTS

Additional information can be given in the template, such as to not include funder information in the acknowledgments section.

REFERENCES

Lees-Miller, J., Hammersley, J., and Wilson, R. (2010). Theoretical maximum capacity as benchmark for empty vehicle redistribution in personal rapid transit. *Transportation Research Record: Journal of the Transportation Research Board*, (2146):76–83.