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The R Package BHAM: Fast and Scalable Bayeisan Hierarchical Additive Model for High-dimensional Data

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Abstract

The abstract of the article.

Keywords: keywords, not capitalized, Java.

1. Introduction

Growing interest in fitting flexible and interpretable models, particular in high-dimensional data analysis, for the purpose of variable selection and predictive modelling.

Characteristic of these software includes: scalability, fast computation, and model flexibility and implementation easiness.

1.1. Literature Review

We enlist current available packages that have similar functionality, i.e. modeling to the best of our knowledge. To note, we don't list packages that are unable of handling high-dimensional data, for example the well known R package `mgcv`, and high-dimensional packages that requires extra steps to construct the design matrix of functional form of predictors (Such implementation can be found with grouped sparse models, for example `SGL`.)

Generalized Additive Model

- `COSSO`
- `spikeSlabGAM`

- `sparseGAM`

Additive Cox Proportional Hazard Model

- `COSSO`
- `tfCox`

In this article, we focus on the packages that can directly construct additive models for high-dimensional data anlaysis, instead of requiring additional step of constructing design matrix of functional form of the variables before fitting a sparse model.

2. Bayesian Hierarchical Additive Model

2.1. Gerenalized Additive Model

2.2. Cox Proportional Hazard Model

3. R Functions

3.1. Model fitting

High-dimension Smoothing Formula

```
R> x <- 1:10
R> x
```

```
 [1]  1  2  3  4  5  6  7  8  9 10
```

Model Fitting

Covariate Adjustment

3.2. Model Summary

Functional Selection

Curve Plotting

Model Performance

4. Metabolomics Data Analysis with **BHAM**

4.1. Contious Outcome

4.2. Binary Outcome

4.3. Survival Outcome

5. Conclusion

This template demonstrates some of the basic LaTeX that you need to know to create a JSS article.

5.1. Code formatting

In general, don't use Markdown, but use the more precise LaTeX commands instead:

- Java
- **plyr**

One exception is inline code, which can be written inside a pair of backticks (i.e., using the Markdown syntax).

If you want to use LaTeX commands in headers, you need to provide a `short-title` attribute. You can also provide a custom identifier if necessary. See the header of Section 6 for example.

6. R code

Can be inserted in regular R markdown blocks.

6.1. Features specific to rticles

- Adding short titles to section headers is a feature specific to **rticles** (implemented via a Pandoc Lua filter). This feature is currently not supported by Pandoc and we will update this template if it is officially supported in the future.
- Using the `\AND` syntax in the `author` field to add authors on a new line. This is a specific to the `rticles::jss_article` format.

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