Dear Editor,

We are pleased to submit our manuscript, "Asymptotic Benchmarking and Performance Testing with the `atime` Package," for consideration for publication in the R Journal.

The primary contribution of this manuscript is the introduction of the `atime` package, which facilitates asymptotic benchmarking and performance testing for R code. Unlike traditional benchmarking tools that focus solely on fixed data sizes, the `atime` package provides the capability to measure time and memory usage across sequences of increasing data sizes. This feature allows users to estimate complexity classes (big-O notation) and evaluate empirical performance against theoretical expectations.

Key contributions of our work include the following:

* Performance Testing: The manuscript demonstrates how the `atime` package can be utilized for continuous performance testing of R packages, such as `data.table`, by executing tests locally or integrating them with GitHub Actions. The package offers features for prototyping and defining tests, estimating throughput, and analyzing performance characteristics in practical scenarios.
* Comparative Analysis: The manuscript provides a detailed comparison of the `atime` package with other benchmarking and performance testing tools, including `bench` and `touchstone`. We emphasize the advantages of `atime` in supporting asymptotic analysis and its convenience features, such as automatic termination when execution time exceeds predefined limits.
* Real-World Applications: The manuscript includes several examples illustrating the use of `atime` to identify and address asymptotic analysis in base R. For example, our analysis revealed and helped resolve performance issues in some `data.table` functions.

To ensure broader relevance, the manuscript also presents comparisons with other R packages that provide similar functionality for benchmarking, including `microbenchmark`, `bench`, and `system.time`. These comparisons are discussed in terms of functionality, syntax, output, and speed. Specific sections of the manuscript include:

* Table 1 and the Related Work section: An overview of the benchmarking features supported by each R package or function.
* Comparison with bench::press for Asymptotic Analysis: A discussion of the differences in the approaches and capabilities of the tools.
* Comparisons Between `atime` and Other Software: An examination of the strengths and limitations of `atime` compared to alternatives, particularly in the context of performance testing.

This work has significant implications for developers and users of statistical software, enabling the identification of inefficiencies and promoting the development of scalable R functions. For reproducibility, the submission package includes the necessary R scripts and a comprehensive workflow to reproduce all results presented in the manuscript.

We suggest the following reviewers for this manuscript, as they possess expertise in benchmarking, performance testing, and R package development:

Thank you for your time and consideration of our manuscript. We look forward to your feedback and are hopeful that this work will make a valuable contribution to the field.

Sincerely,

Doris Afriyie Amoakohene