ggsignif: Displaying Significance Brackets for 'ggplot2'

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Summary

Research hypotheses are often concerned with the difference between two groups and statistical tests provide indicators (like p-values or Bayes factors) about the evidence for or against such differences. The R package, `ggsignif` provides a quick way to visualize such pairwise indicators as an annotation in a plot, for example showing if a difference is statistically significant. `ggsignif` follows the principles of the grammar of graphics (Wilkinson, 2012) and provides a new layer that can be added to plots made with the `ggplot2` package (Wickham, 2016).

Statement of Need

During the exploratory analysis of data with discrete covariates, researchers commonly start with a one-way ANOVA to see if there are any differences in the group means. This is typically followed up with multiple comparisons to see if specific levels of the discrete covariates differ significantly. The `ggsignif` package provides a way to graphically display all or a few (depending on the context of the research hypotheses) of such comparisons. It is also used by other R package developers as the back-end for graphical display of pairwise comparisons, such as `ggpubr` (Kassambara, 2020), `ggstatsplot` (Patil, 2018), and more. These packages demonstrate how `ggsignif` can be extended to display results from any type of pairwise comparisons test (e.g., Bayesian t-test, Dunn test, etc.).

Features

The following is a simple example demonstrating how a group difference can be annotated using `geom_signif` layers from `ggsignif` package.

```
set.seed(123)
library(ggplot2)
library(ggsignif)

ggplot(mpg, aes(class, hwy)) +
  geom_boxplot() +
  geom_signif(
    comparisons = list(c("compact", "midsize"), c("minivan", "suv")),
    map_signif_level = TRUE
  ) +
  ylim(NA, 48)
```
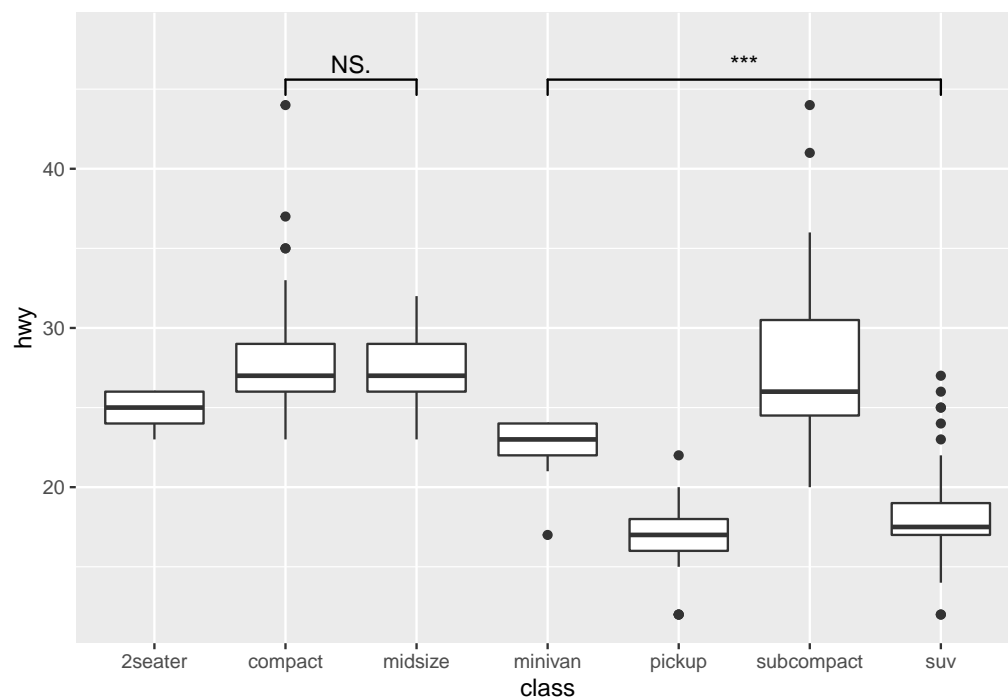
For more advanced examples, the readers are encouraged to read the package website: https://const-ae.github.io/ggsignif/.

Licensing and Availability

`ggsignif` is licensed under the GNU General Public License (v3.0), with all source code stored at GitHub, and with a corresponding issue tracker for bug reporting and feature enhancements. In the spirit of honest and open science, we encourage requests/tips for fixes, feature updates, as well as general questions and concerns via direct interaction with contributors and developers, by filing an issue. See the *Contribution Guidelines* for this package.

Acknowledgements

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References

Kassambara, A. (2020). *ggpubr: 'ggplot2' based publication ready plots*. Retrieved from https://CRAN.R-project.org/package=ggpubr

Patil, I. (2018). ggstatsplot: 'ggplot2' based plots with statistical details. *CRAN*. doi:10.5281/zenodo.2074621

Wickham, H. (2016). *ggplot2: Elegant graphics for data analysis*. Springer-Verlag New York. Retrieved from https://ggplot2.tidyverse.org

Wilkinson, L. (2012). The grammar of graphics. *Handbook of computational statistics* (pp. 375–414). Springer.