

DWLS

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January 7, 2022

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- Type: Package
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Dampened Weighted Least Squares**

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Authors:

```
c(person("Daphne", "Tsoucas", email = "dtsoucas@gmail.com (mailto:dtsoucas@gmail.com)", role = "aut"),  
  person("Adriana", "Sistig", email = "adriana.sistig@icahn.mssm.edu (mailto:adriana.sistig@icahn.mssm.edu)", role  
    = c("aut", "cre"))))
```

Description

The rapid development of single-cell transcriptomic technologies has helped uncover the cellular heterogeneity within cell populations. However, bulk RNA-seq continues to be the main workhorse for quantifying gene expression levels due to technical simplicity and low cost. To most effectively extract information from bulk data given the new knowledge gained from single-cell methods, we have developed a novel algorithm to estimate the

cell-type composition of bulk data from a single-cell RNA-seq-derived cell-type signature. Comparison with existing methods using various real RNA-seq data sets indicates that our new approach is more accurate and comprehensive than previous methods, especially for the estimation of rare cell types. More importantly, our method can detect cell-type composition changes in response to external perturbations, thereby providing a valuable, cost-effective method for dissecting the cell-type-specific effects of drug treatments or condition changes. As such, our method is applicable to a wide range of biological and clinical investigations. Dampened weighted least squares (DWLS) is an estimation method for gene expression deconvolution, in which the cell-type composition of a bulk RNA-seq data set is computationally inferred. This method corrects common biases towards cell types that are characterized by highly expressed genes and/or are highly prevalent, to provide accurate detection across diverse cell types. See: <https://www.nature.com/articles/s41467-019-10802-z.pdf> (<https://www.nature.com/articles/s41467-019-10802-z.pdf>) for more information about the development of DWLS and the methods behind our functions.

URL

<https://github.com/sistia01/DWLS> (<https://github.com/sistia01/DWLS>)

BugReports

<https://github.com/sistia01/DWLS/issues> (<https://github.com/sistia01/DWLS/issues>)

Depends

R ($\geq 3.5.0$)

Imports

quadprog, reshape, Seurat, ROCR, varhandle, MAST, dplyr, stats, utils, e1071, SummarizedExperiment, devtools

License

GPL-2

Encoding

UTF-8

Language

en-US

LazyData

true

RoxygenNote

7.1.2

Suggests

testthat (>= 3.0.0)

Config/testthat/edition: 3