

# Shantropy: Computes Shannon entropy for gene expression data

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## Introduction:

Computes Shannon entropy for gene expression across cell types or conditions to find cell type or condition specific gene expression patterns genomic regions.

## Installation:

Install the package from Github.

```
devtools::install_github("nashchem/Shantropy")
```

## Quick start:

Load the package into R session.

```
library(Shantropy)
```

The enrichmotifpairR package includes an example dataset called example\_data.

```
data(example_data)
```

Compute cell type/condition specific expression.

```
cell_type_data <- compute_ShannonEntropy(data = data, exp_thr = 1,  
                                         cell_specificity_thr = 1)
```

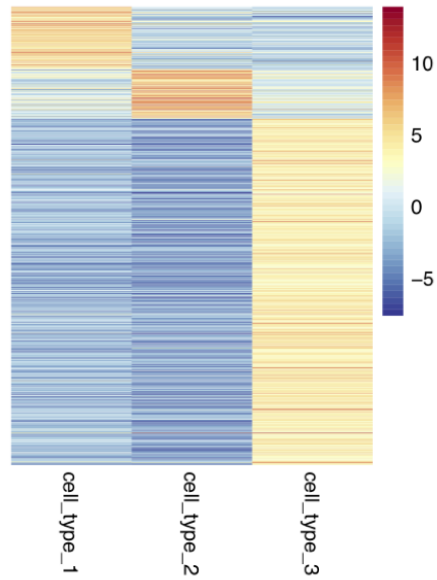
Plot the cell type/condition specific expression data. Install/load the required packages for visualization.

```
library(pheatmap)  
library(RColorBrewer)
```

Plotting version 1

```
data2 <- cell_type_data[, 2:4]  
pheatmap::pheatmap(log2(data2), cluster_rows = FALSE, cluster_cols = FALSE,  
                    scale = "none", show_rownames = FALSE, show_colnames = TRUE,  
                    color = colorRampPalette(rev(RColorBrewer::brewer.pal(n = 11,  
                                   name = "RdYlBu")))(50))  
dev.copy2pdf(file="Shannon_entropy_based_cell_type_expression_heatmap_v1.pdf",  
             width = 3, height = 4)
```

```
path_to_fig <- '/Users/njayavel/Downloads/Shantropy/data/Shannon_entropy_based_cell_type_expression_he  
knitr::include_graphics(path_to_fig)
```



Plotting version 2

```
mycolor <- colorRampPalette(c("#4462DB", "Yellow", "Red"))(100)
data2 <- cell_type_data[, 2:4]
pheatmap::pheatmap(log2(data2 + 1), cluster_rows = FALSE, cluster_cols = FALSE,
  scale = "none", show_rownames = FALSE, show_colnames = TRUE,
  color = mycolor)
dev.copy2pdf(file="Shannon_entropy_based_cell_type_expression_heatmap_v2.pdf",
  width = 3, height = 3)
```

```
knitr::include_graphics('/Users/njayavel/Downloads/Shantropy/data/Shannon_entropy_based_cell_type_expre:
```

