DPT

immediate

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Contents

Diffusion Pseudo Time (DPT) is a pseudo time metric based on the transition probability of a diffusion process Haghverdi et al. (2016).

destiny supports DPT in addition to its primary function of creating DiffusionMaps from data.

In [2]: library(destiny)  # load destiny...
    data(guo)           # ... and sample data

DPT is in practice independent of Diffusion Maps:

```
data
    transition probabilities
        DiffusionMap
            DPT
```

However in order not to overcomplicate things, in destiny, you have to create DPT objects from DiffusionMap objects.
(If you really only need the DPT, skip Diffusion Component creation by specifying n_eigs = 0)

In [4]: dm <- DiffusionMap(guo)
    dpt <- DPT(dm)

The resulting object of a call like this will have three automatically chosen tip cells. Plotting without parameters results in the DPT of the first root cell:

In [5]: plot(dpt, pch = 20)  # "pch" for prettier points
Other possibilities include the DPT from the other tips or everything supported by `plot.DiffusionMap`:

**In [7]:**
```
par(mfrow = c(1,2), pch = 20, mar = c(2,2,0,1))
plot(dpt, col_by = 'DPT3')
plot(dpt, col_by = 'Gata4', pal = viridis::magma)
```

The DPT object also contains a clustering based on the tip cells and DPT, and you can specify where to draw paths from and to:

**In [9]:**
```
plot(dpt, root = 2, paths_to = c(1,3), col_by = 'branch', pch = 20)
```
You can further divide branches. First simply plot branch colors like we did above, then identify the number of the branch you intend to plot, and then specify it in a subsequent `plot` call. In order to see the new branches best, we specify a `dcs` argument that visually spreads out all four branches.

**In [10]:**
```
plot(dpt, col_by = 'branch', divide = 3, dcs = c(-1,3,-2), pch = 20)
```
References

Haghverdi, L., M. Büttner, F. A. Wolf, F. Buettner, and F. J. Theis