DPT

immediate

November 6, 2019

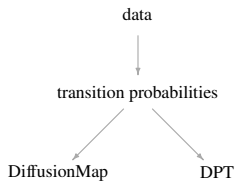
Contents

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:

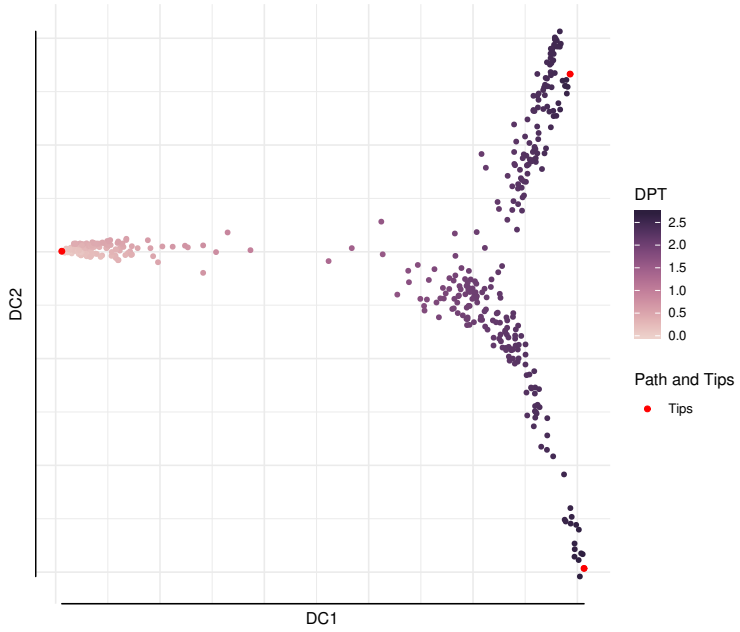


However in order not to overcomplicate things, in *destiny*, you have to create DPT objects from `DiffusionMap` objects.
(If you really only need the DPT, skip Diffusion Component creation by specifying `n_eigs = 0`)

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

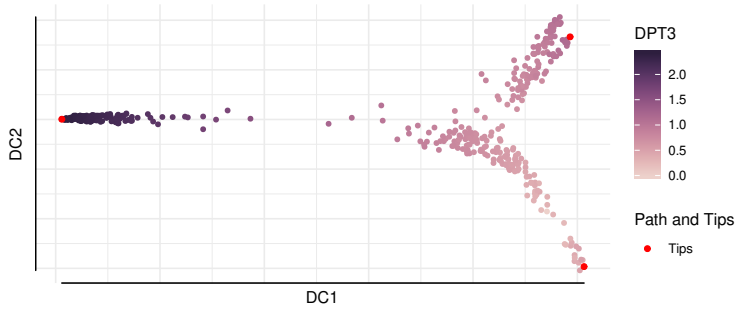
The resulting object of a call like this will have three automatically chosen tip cells. Plotting without parameters results in the DPT of the first root cell:

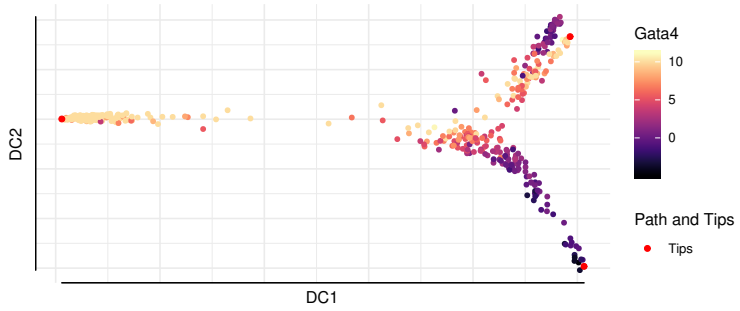
```
In [5]: plot(dpt)
```



Other possibilities include the DPT from the other tips or everything supported by `plot.DiffusionMap`:

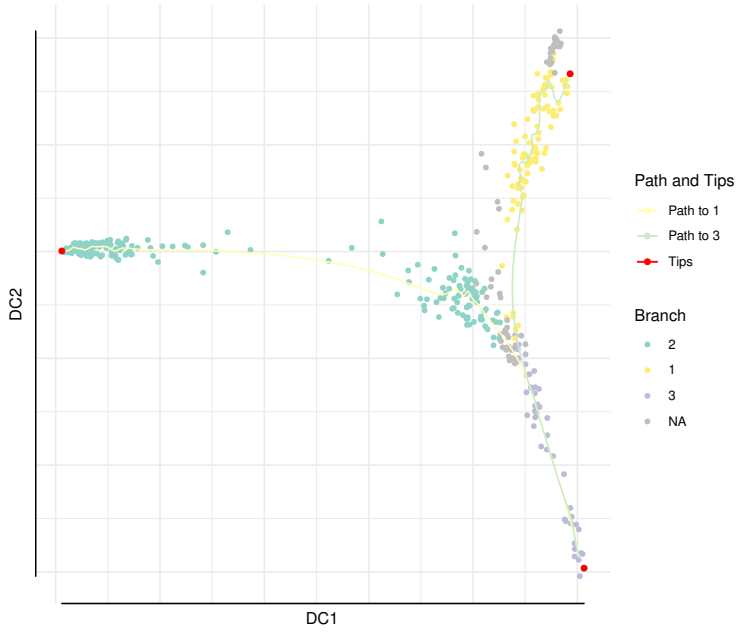
```
In [7]: par(mfrow = c(1,2), mar = c(2,2,0,1))
        plot(dpt, col_by = 'DPT3')
        plot(dpt, col_by = 'Gata4', pal = viridis::magma)
```





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:

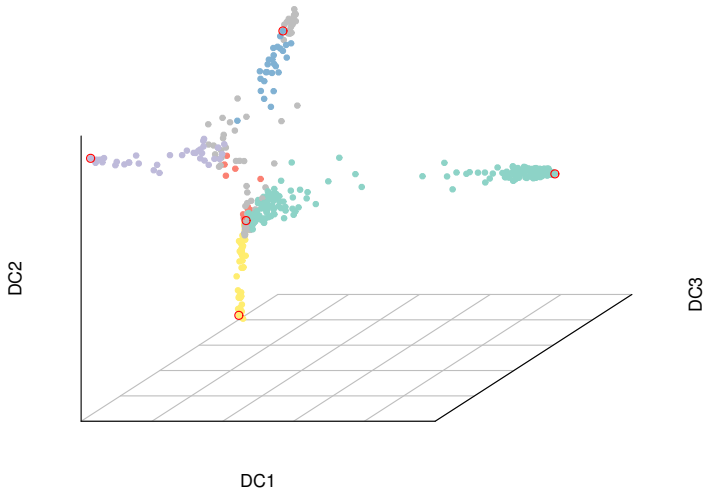
```
In [9]: plot(dpt, root = 2, paths_to = c(1,3), col_by = 'branch')
```



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 out all four branches.

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

```
Warning message in title(main, sub, ...):
“"legend_name" ist kein Grafikparameter”Warning message in plot.xy(xy.coords(x, y),
“"legend_name" ist kein Grafikparameter”
```



References

Haghverdi, L., M. Büttner, F. A. Wolf, F. Buettner, and F. J. Theis
2016. Diffusion pseudotime robustly reconstructs lineage branching. *Nature Methods*.