DPT

immediate

October 27, 2020

Contents

Diffusion Pseudo Time (DPT) is a pseudo time metric based on the transition probability of a diffusion process Haghverdi et al. (2016).
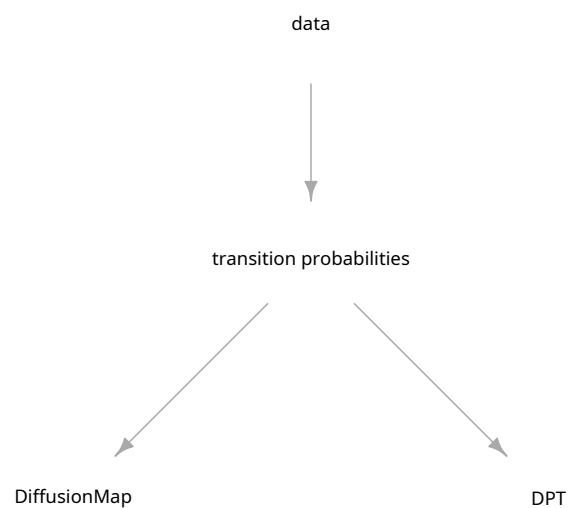
destiny supports DPT in addition to its primary function of creating `DiffusionMaps` from data.

```
In [2]: library(destiny)     # load destiny...
        data(guo)            # ...and sample data
        library(gridExtra)   # Also we need grid.arrange

Registered S3 method overwritten by 'xts':
  method      from
  as.zoo.xts zoo
```

DPT is in practice independent of Diffusion Maps:

However in order not to overcomplicate things, in *destiny*, you have to create DPT objects from `Diffu-sionMap` objects.
(If you really only need the DPT, skip Diffusion Component creation by specifying `n_eigs = 0`)
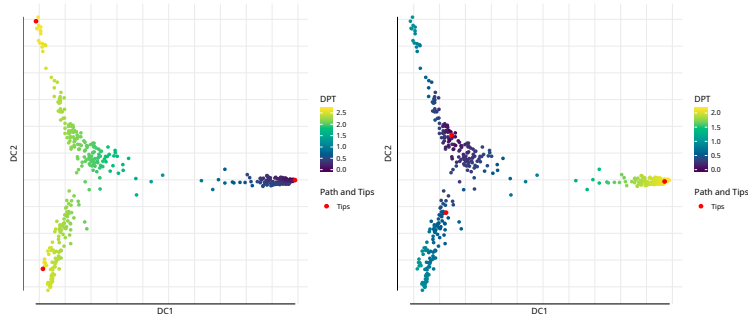
```
In [4]: dm <- DiffusionMap(guo)
        dpt <- DPT(dm)
```

The resulting object of a call like this will have three automatically chosen tip cells. You can also specify tip cells:

```
In [5]: set.seed(4)
        dpt_random <- DPT(dm, tips = sample(ncol(guo), 3L))
```
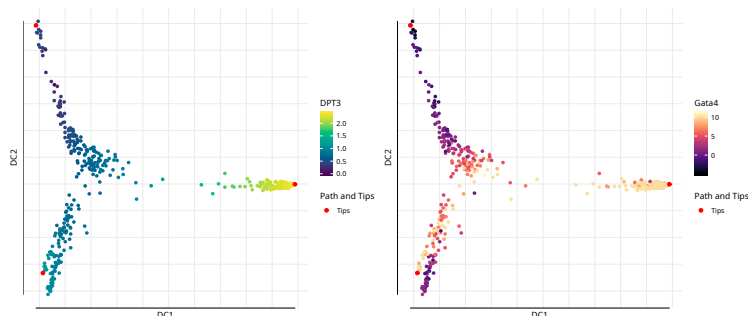
Plotting without parameters results in the DPT of the first root cell:

```
In [7]: grid.arrange(plot(dpt), plot(dpt_random), ncol = 2)
```
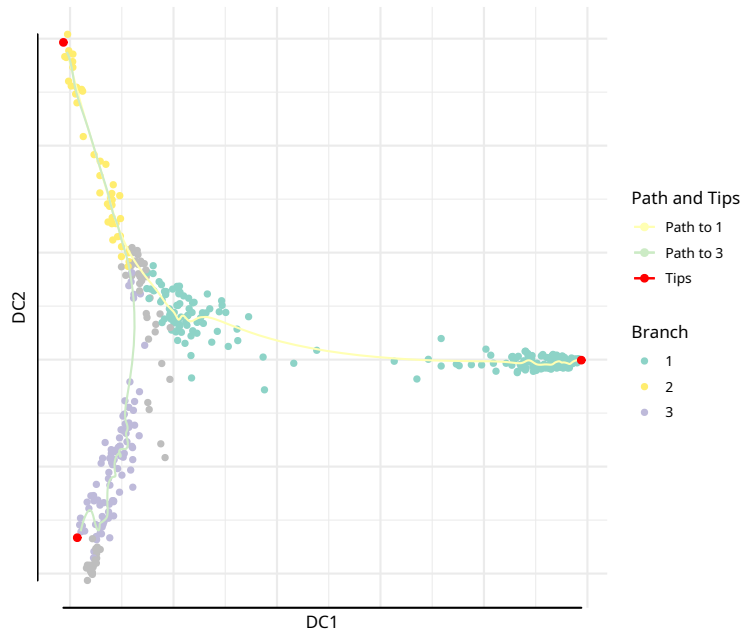

Other possibilities include the DPT from the other tips or everything supported by `plot.DiffusionMap`:

```
In [8]: grid.arrange(
          plot(dpt, col_by = 'DPT3'),
          plot(dpt, col_by = 'Gata4', pal = viridis::magma),
          ncol = 2
        )
```


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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 [10]: 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.
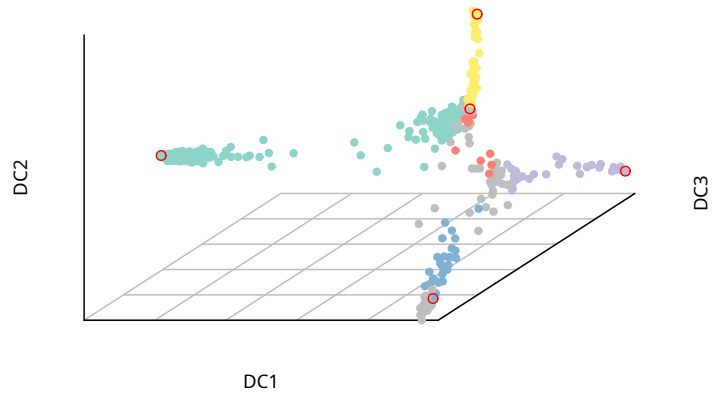
```
In [11]: plot(dpt, col_by = 'branch', divide = 3, dcs = c(-1,-3,2), pch = 20)
Warning message in title(main, sub, ...):
""legend_name" ist kein Grafikparameter"
Warning message in plot.xy(xy.coords(x, y), type = type, ...):
""legend_name" ist kein Grafikparameter"
```

References

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