DPT

immediate

March 17, 2017

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]:**
```r
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]:**
```r
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