What’s new in igraph and networks

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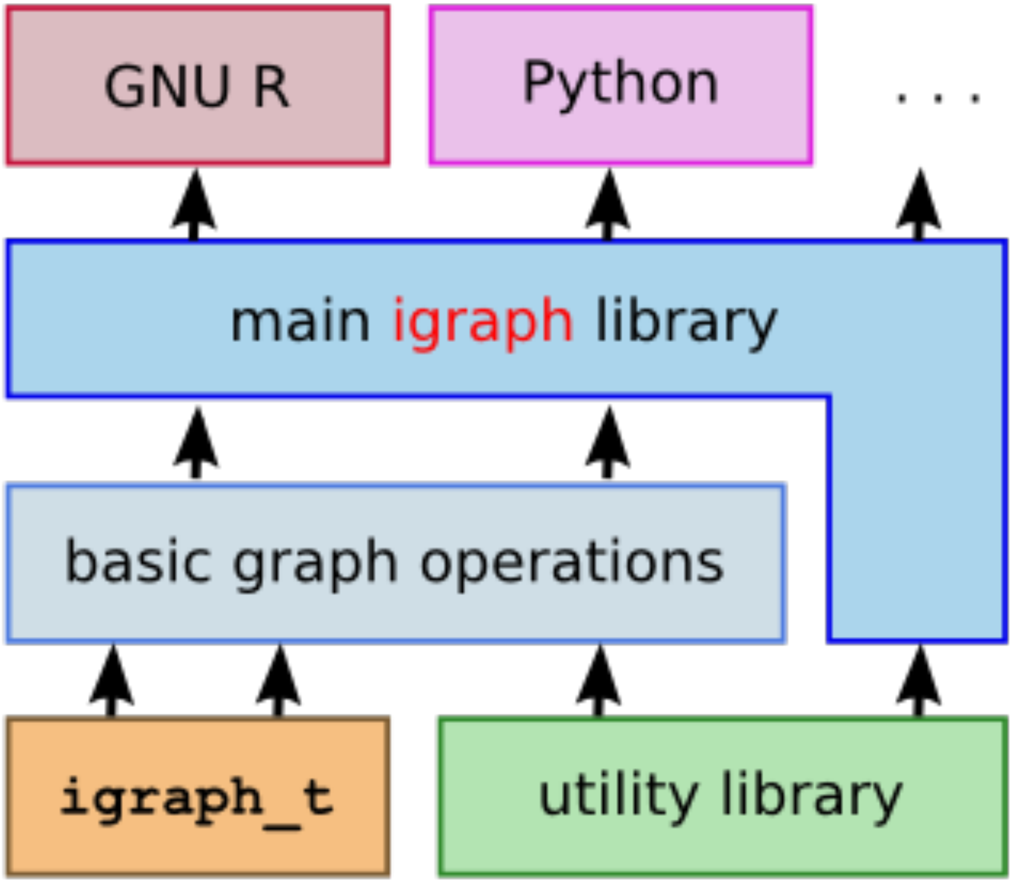
About igraph



About igraph

- Network analysis library, written mostly in C/C++.
- Interface to R and Python
- https://github.com/igraph
- http://igraph.org
- Mailing list, stack overflow help.
- Open GitHub issues for bugs

What is new?

- New ways to manipulate networks
- `[` and `[[` operators
- Better function names, manipulators
- Pipe friendly
- New methods:
    - Graph layout algorithms
    - New methods for graph clustering
    - Graphlet decomposition
    - Embeddings
    - Graph matching
    - etc.

The [operator

Imaginary adjacency matrix, queries

```r
air['BOS', 'SFO']
```

```
#> [1] 6
```

```r
CA <- c("LAX", "SFO", "SAN", "SMF", "SNA", "BUR", "OAK", "ONT", "SJC")
air['BOS', CA]
```

```
#> LAX SFO SAN SMF SNA BUR OAK ONT SJC
#>   7   6   1   0   0   0   0   0   1
```

The `[` operator

Imaginary adjacency matrix, manipulation

Add an edge (and potentially set its weight):

```r
air["BOS", "ANC"] <- TRUE
air["BOS", "ANC"]
```

```
#> [1] 1
```

Remove an edge:

```r
air["BOS", "ANC"] <- FALSE
air["BOS", "ANC"]
```

```
#> [1] 0
```

The `[[` operator

Imaginary adjacency list, adjacenct vertices:

```
air[["BOS"]]
```

```
#> $BOS
#> + 269/755 vertices, named:
#>   [1] BGR JFK JFK JFK JFK JFK JFK JFK JFK JFK JFK JFK JFK JFK JFK
#>  [16] LAS LAS LAS MIA MIA EWR EWR EWR EWR EWR EWR EWR EWR EWR EWR
#>  [31] LAX LAX LAX LAX LAX LAX LAX PBI PBI PIT PIT PIT PIT PIT SFO
#>  [46] SFO SFO SFO SFO SFO IAD IAD IAD IAD IAD IAD IAD IAD IAD IAD
#>  [61] BDL BDL BUF BUF BUF BUF BWI BWI BWI BWI BWI BWI BWI BWI CAK
#>  [76] CLE CLE CLE CLE CLE CLT CLT CLT CLT CLT CLT CLT CLT CLT CMH
#>  [91] CMH CVG CVG CVG CVG CVG CVG CVG CVG CVG CVG DCA DCA DCA DCA
#> [106] DCA DCA DCA DCA DCA DTW DTW DTW DTW DTW DTW DTW DTW DTW DTW
#> [121] DTW DTW DTW GSO IND IND LGA LGA LGA LGA LGA LGA LGA LGA MDT
#> [136] MKE MKE MKE MSP MSP MSP MSP MSP MSP MSY MYR ORF PHF PHL PHL
#> + ... omitted several vertices
```

The [[operator

Imaginary adjacency list, adjacent vertices:

```
air[[, "BOS"]]
```

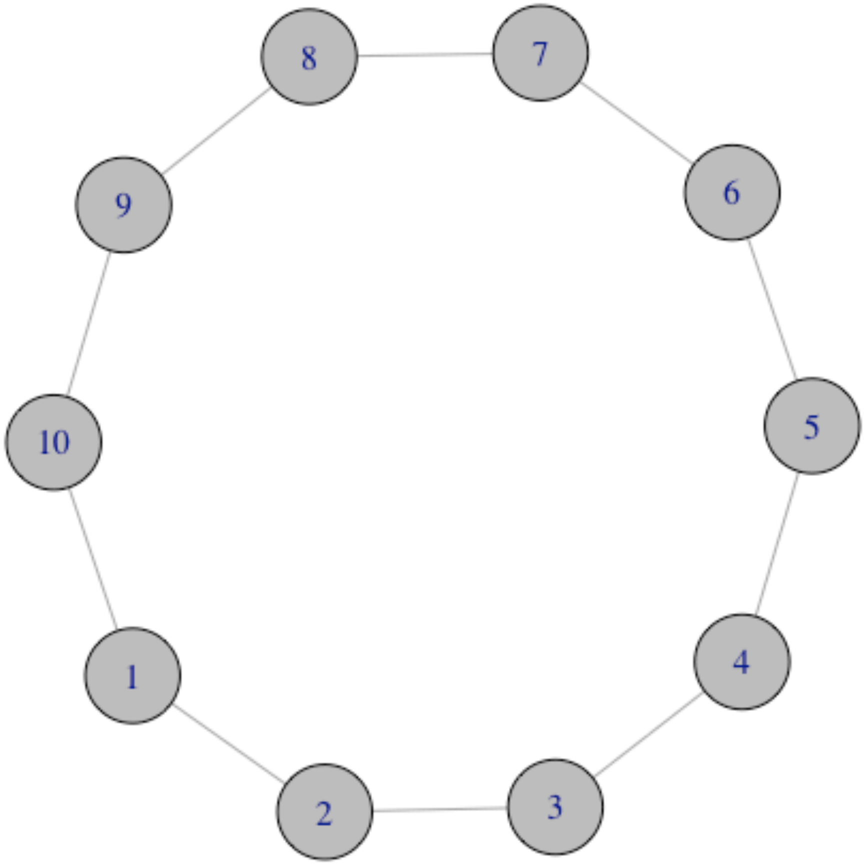
```
#> $BOS
#> + 256/755 vertices, named:
#>   [1] BGR JFK JFK JFK JFK JFK JFK JFK JFK JFK JFK JFK JFK LAS LAS
#>  [16] LAS MIA MIA MIA EWR EWR EWR EWR EWR EWR EWR EWR LAX LAX LAX
#>  [31] LAX LAX LAX LAX LAX PBI PBI PIT PIT PIT PIT SFO SFO SFO SFO
#>  [46] SFO SFO IAD IAD IAD IAD IAD IAD IAD IAD IAD BDL BDL BDL BUF
#>  [61] BUF BUF BUF BWI BWI BWI BWI BWI BWI CAK CAK CLE CLE CLE CLE
#>  [76] CLE CLE CLT CLT CLT CLT CLT CLT CLT CLT CMH CMH CVG CVG CVG
#>  [91] CVG CVG CVG DCA DCA DCA DCA DCA DCA DCA DCA DCA DTW DTW DTW
#> [106] DTW DTW DTW DTW DTW DTW DTW DTW DTW IND IND LGA LGA LGA LGA
#> [121] LGA LGA MDT MKE MKE MKE MSP MSP MSP MSP MSP MSP MSP MSP MSY
#> [136] MSY MYR PHF PHL PHL PHL PHL PHL PHL PHL PHL PHL RDU RDU RDU
#> + ... omitted several vertices
```

Consistent function names

`make_*`, `sample_*`, `cluster_*`, `layout_*`, etc.

Manipulators for **`make_`** and **`sample_`**

```
ring <- make_(ring(10), with_vertex_(color = "grey", size = 25))
par(mar=c(0,0,0,0)); plot(ring)
```



Manipulators for **make_** and **sample_**

```
rg <- sample_(degseq(c(2,4,6,8,2,2,2,2)),
              simplified())
```

Manipulators for `layout_`

```
g <- make_ring(5) + make_full_graph(5) + make_star(5, mode="undir")
coords <- layout_(g, in_circle(), component_wise())
par(mar=c(0,0,0,0)); plot(g)
```

Pipe friendly syntax

```
g <- make_empty_graph(10) %>%
  add_vertices(5) %>%
  set_vertex_attr("name", value = LETTERS[1:5]) %>%
  add_edges(c(1,2,2,3,3,4,4,5,5,1)) %>%
  set_edge_attr("weight", value = runif(gsize(.)))
```

Easier connection to other packages

```r
library(networkD3)
d3_net <- simpleNetwork(as_data_frame(karate, what = "edges")[, 1:3])
d3_net
```

Current work

- Better connection to other packages and external software
- Inference
- Infrastructure cleanup