CREATING CUSTOM HTMLWIDGETS FOR SHINY

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SETTING UP THE HTMLWIDGET

"The htmlwidgets package provides a framework for creating R bindings to JavaScript libraries."

```
devtools::create("mywidget")
setwd("mywidget")
htmlwidgets::scaffoldWidget("mywidget")
devtools::install()
```

To learn more, see Ramnath V., Kenton R., and Rstudio's **tutorial** on creating htmlwidgets.

FILE STRUCTURE

```
.
├── DESCRIPTION
├── inst
│   └── htmlwidgets
│       ├── mywidget.js
│       └── mywidget.yaml
├── mywidget.Rproj
├── NAMESPACE
└── R
    └── mywidget.R
```

R OUTPUT

```
library(mywidget)
mywidget("Hello World")
```

Hello World

ADDING THE JS CODE

1. Find or develop the JS code you want to bind to R.
2. Replace JS code in
   `./inst/htmlwidgets/hive.js`
3. Copy supporting JS and CSS into
   `./inst/htmlwidgets/lib/` folder.
4. Define dependencies in
   `./inst/htmlwidgets/hive.yaml`

ENTER HIVE PLOTS

- Like the functionality and look of Mike Bostock's D3 implementation of **hive plots**.
- A simpler version is found **here**.

CREATE THE BINDINGS

Goal: Get R dataframe to look just like this d3 dataset.

```
var nodes = [
  {x: 0, y: .1},
  {x: 0, y: .9},
  {x: 1, y: .2},
  {x: 1, y: .3},
  {x: 2, y: .1},
  {x: 2, y: .8}
];
var links = [
  {source: nodes[0], target: nodes[2]},
  {source: nodes[1], target: nodes[3]},
  {source: nodes[2], target: nodes[4]},
  {source: nodes[2], target: nodes[5]},
  {source: nodes[3], target: nodes[5]},
  {source: nodes[4], target: nodes[0]},
  {source: nodes[5], target: nodes[1]}
];
```

R BINDING

```
hive <- function(nodes,
                 links,
                 innerRadius = 40,
                 outerRadius = 240,
                 opacity = 0.7,
                 width = NULL,
                 height = NULL,
                 elementId = NULL) {

  # sort in order of node id
  if("id" %in% colnames(nodes)) {
    nodes <- nodes[order(nodes$id),]
    nodes$id <- NULL
  }

  # color by axis if no coloring is supplied
  if(!("color" %in% colnames(nodes))) {
    nodes$color <- nodes$x
  }

  # forward options using x
  x = list(
    nodes = nodes,
    links = links,
    numAxis = max(nodes$x)+1,
```

JAVASCRIPT BINDING

For d3, we use the `dataframeToD3()` helper function:

```
// alias options
var options = x.options;

// convert links and nodes data frames to d3 friendly format
var nodes = HTMLWidgets.dataframeToD3(x.nodes);
var prelinks = HTMLWidgets.dataframeToD3(x.links);

// create json of link sources and targets
var links = [];
prelinks.forEach(function(d){
  var tmp = {};
  tmp.source=nodes[d.source];
  tmp.target=nodes[d.target];
  links.push(tmp);
});
```

PUTTING IT ALL TOGETHER

```
library(hiveD3)
nodes = data.frame(id=c(0,1,2,3,4,5,6,7,8),
                   x=c(0,0,1,1,2,2,3,3,4),
                   y=c(.1,.9,.2,.3,.1,.8,.3,.5,.9))
links = data.frame(source=c(0,1,2,2,3,4,5,6,7,8,8),
                   target=c(2,3,4,5,5,6,7,8,8,0,1))


hive_no_int(nodes=nodes,links=links, width = "100%", height = "500p
```

INITIAL R OUTPUT

FINISHING TOUCHES

- Adding interaction
- Creating and sharing your package
- Creating R documentation using RStudio and roxygen2
- Adding your package to **htmlwidget gallery**

THE FINAL PRODUCT

```
library(devtools)
install_github('nielsenmarkus11/hiveD3')

library(hiveD3)

nodes = data.frame(id=c(0,1,2,3,4,5,6,7,8),
                   x=c(0,0,1,1,2,2,3,3,4),
                   y=c(.1,.9,.2,.3,.1,.8,.3,.5,.9))
links = data.frame(source=c(0,1,2,2,3,4,5,6,7,8,8),
                   target=c(2,3,4,5,5,6,7,8,8,0,1))

hive(nodes=nodes,links=links, width = "100%", height = "500px")
```

INTERACTIVE R OUTPUT

REFERENCES

- Bostock M, Morin R (2012). **Hive Plots**. Retrieved from **https://bost.ocks.org/mike/hive/**.
- Bostock M (2016). **Hive Plot (Links)**. Retrieved from **https://bl.ocks.org/mbostock/2066415**.
- Bostock M (2017). **D3 Data-Driven Documents**. Retrieved from **https://d3js.org/**.

REFERENCES (CONT.)

- Krzywinski M, Birol I, Jones S, Marra M (2011). **Hiv Plots — Rational Approach to Visualizing Networks**. Briefings in Bioinformatics (early access December 2011, doi: 10.1093/bib/bbr069).
- Vaidyanathan R, Russell K, RStudio, Inc. (2014-2015 **Creating a widget**. Retrieved from **http://www.htmlwidgets.org/develop_intro.h**

QUESTIONS?