

Exc3A - Grey's Anatomy

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```
library(igraph)
require(igraph)
```

Load The Data set:

```
grey.data = read.csv('ga_edgelist.csv',header = T)
grey_data = graph.data.frame(grey.data,directed = F)
```

Centrality Degree

Betweenness

```
bet = betweenness(grey_data)
bet = sort(bet,decreasing = T)
```

```
names(bet[1])
```

```
## [1] "sloan"
```

Closeness

```
close = closeness(grey_data)
close = sort(close, decreasing = T)
```

```
names(close[1])
```

```
## [1] "torres"
```

Eigenvector

```
eigen = evcent(grey_data)
eigen = sort(eigen$vector, decreasing = T)
```

```
names(eigen[1])
```

```
## [1] "karev"
```

Community Detection

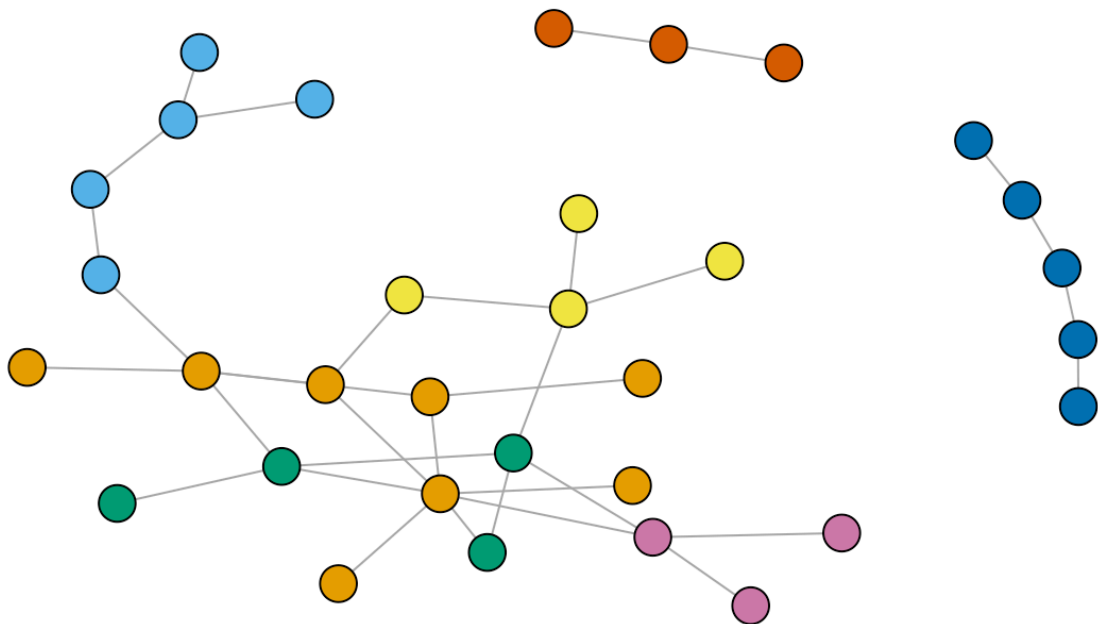
We started the algorithms:

1. Girvan-Newman
2. Multi-Level

Girvan-Newman

```
girvan = edge.betweenness.community(grey_data)
```

```
membership_girvan = membership(girvan)  
plot(grey_data, vertex.size=7, vertex.label=NA, vertex.color=membership_girvan, asp=  
FALSE)
```



Community received and their size

```
max(levels(as.factor(membership_girvan)))
```

```
## [1] "7"
```

```
summary(as.factor(membership_girvan))
```

```
## 1 2 3 4 5 6 7  
## 8 5 4 4 5 3 3
```

Modularity

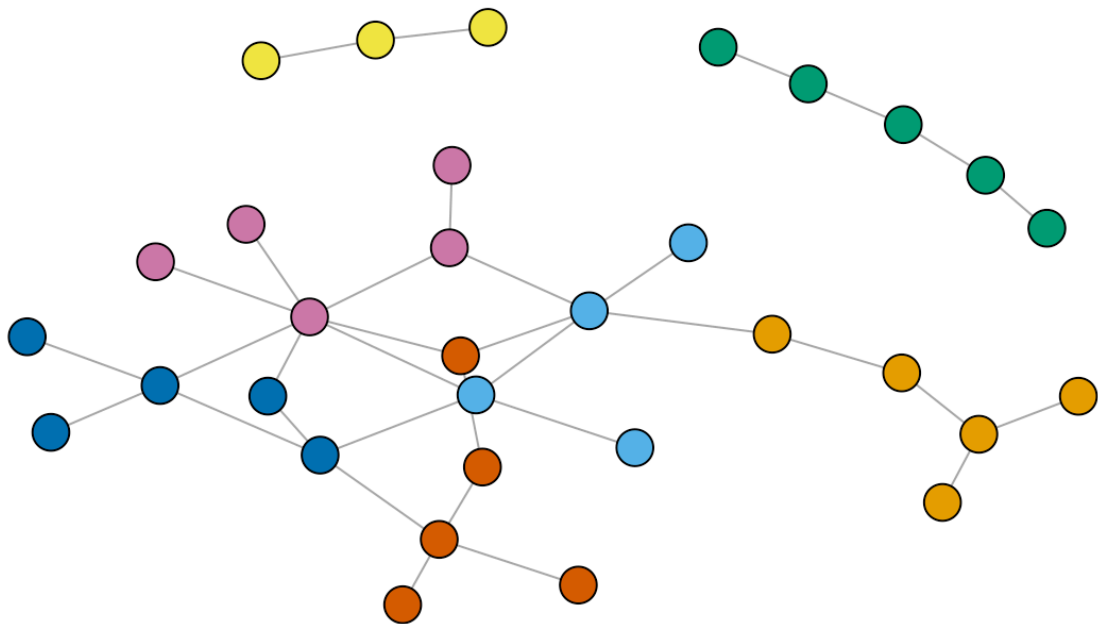
```
girvan$modularity
```

```
## [1] -0.04584775 -0.01773356 0.01081315 0.03849481 0.06617647  
## [6] 0.09472318 0.12326990 0.14965398 0.17560554 0.20285467  
## [11] 0.23096886 0.25865052 0.28633218 0.31358131 0.34083045  
## [16] 0.36894464 0.39576125 0.41479239 0.44247405 0.46712803  
## [21] 0.49134948 0.50778547 0.52681661 0.54974048 0.57050173  
## [26] 0.57742215 0.56098616 0.53416955 0.45804498 0.30449827
```

Multi-Level

```
multi = multilevel.community(grey_data)
```

```
membership_multi = membership(multi)  
plot(grey_data, vertex.size=7, vertex.label=NA, vertex.color=membership_multi, asp=F  
ALSE)
```



Community received and their size

```
max(levels(as.factor(membership_multi)))
```

```
## [1] "7"
```

```
summary(as.factor(membership_multi))
```

```
## 1 2 3 4 5 6 7  
## 5 4 5 3 5 5 5
```

Modularity

```
multi$modularity
```

```
## [1] 0.4762111 0.5804498
```