WA. Working with raw data

Introduction to Social Network Analysis in R

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1. Setting up the network

```
# (remove # below and run this if they are not already installed )
# once installed put # back to avoid warnings/errors
#install.packages("igraph")
#install.packages("igraphdata")
library(igraphdata)
library(igraph)
##
## Attaching package: 'igraph'
## The following objects are masked from 'package:stats':
##
       decompose, spectrum
##
## The following object is masked from 'package:base':
##
##
       union
library(Matrix)
## Some setup so plots are bigger with no margins
#default margins
def_marg \leftarrow c(5.1, 4.1, 4.1, 2.1)
#no margins
no_marg \leftarrow c(0, 0, 0, 0)
## load the data and export to .csv
data(UKfaculty)
UKfaculty.df <- igraph::as_data_frame(UKfaculty)</pre>
## This graph was created by an old(er) igraph version.
    Call upgrade_graph() on it to use with the current igraph version
   For now we convert it on the fly...
##
```

```
write.csv(UKfaculty.df,"../data/ukfaculty_df.csv", row.names = FALSE)
```

Load the UKfaculty data drame from the csv file.

```
UKfaculty_df <- read.csv("../data/ukfaculty_df.csv")
EL <- subset(UKfaculty_df, select = c(1, 2))
UKfaculty.edgelist <- matrix(unlist(EL),ncol=2)</pre>
```

Convert Network Edge Data to 'igraph' Objects

```
#general igraph (defaults to directed)
UKfaculty.igraph <- graph.edgelist((UKfaculty.edgelist))</pre>
class(UKfaculty.igraph)
## [1] "igraph"
UKfaculty.igraph
## IGRAPH 877eba7 D--- 81 817 --
## + edges from 877eba7:
## [1] 57->52 76->42 12->69 43->34 28->47 58->51 7->29 40->71 5->37 48->55
## [11] 6->58 21-> 8 28->69 43->21 67->58 65->42 5->67 52->75 37->64 4->36
## [21] 12->49 19->46 37-> 9 74->36 62-> 1 15-> 2 72->49 46->62 2->29 40->12
## [41] 34->35 76->72 7->42 37->42 51->80 38->45 62->64 36->53 62->77 17->61
## [51] 7->68 46->29 44->53 18->58 12->16 72->42 52->32 58->21 38->17 15->51
## [61] 22-> 7 22->69 5->13 29-> 2 77->12 37->35 18->46 10->71 22->47 20->19
## [71] 19->31 68->13 49->69 30->63 5->49 53->75 62->57 73->81 29->69 71->40
## [81] 19->58 49->42 37-> 5 18-> 2 20->80 75->53 15->54 76->58 40->23 5->12
## + ... omitted several edges
```

UKfaculty

```
## IGRAPH 6f42903 D-W- 81 817 --

## + attr: Type (g/c), Date (g/c), Citation (g/c), Author (g/c), Group

## + edges from 6f42903:

## [1] 57->52 76->42 12->69 43->34 28->47 58->51 7->29 40->71 5->37 48->55

## [11] 6->58 21-> 8 28->69 43->21 67->58 65->42 5->67 52->75 37->64 4->36

## [21] 12->49 19->46 37-> 9 74->36 62-> 1 15-> 2 72->49 46->62 2->29 40->12

## [31] 22->29 71->69 4-> 3 37->69 5-> 6 77->13 23->49 52->35 20->14 62->70

## [41] 34->35 76->72 7->42 37->42 51->80 38->45 62->64 36->53 62->77 17->61

## [51] 7->68 46->29 44->53 18->58 12->16 72->42 52->32 58->21 38->17 15->51

## [61] 22-> 7 22->69 5->13 29-> 2 77->12 37->35 18->46 10->71 22->47 20->19

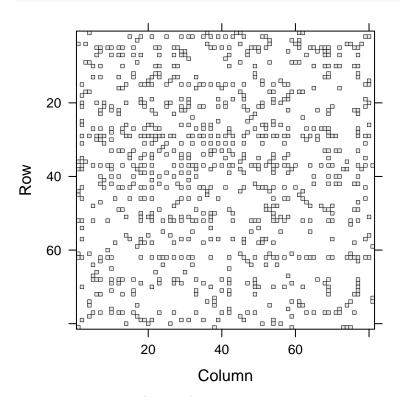
## + ... omitted several edges
```

```
#undirected igraph
UKfaculty.undirected.graph <- graph.edgelist(UKfaculty.edgelist, directed = FALSE)</pre>
class(UKfaculty.undirected.graph)
## [1] "igraph"
UKfaculty.undirected.graph
## IGRAPH b7ad195 U--- 81 817 --
## + edges from b7ad195:
## [1] 52--57 42--76 12--69 34--43 28--47 51--58 7--29 40--71 5--37 48--55
## [11] 6--58 8--21 28--69 21--43 58--67 42--65 5--67 52--75 37--64 4--36
## [21] 12--49 19--46 9--37 36--74 1--62 2--15 49--72 46--62 2--29 12--40
## [31] 22--29 69--71 3-- 4 37--69 5-- 6 13--77 23--49 35--52 14--20 62--70
## [41] 34--35 72--76 7--42 37--42 51--80 38--45 62--64 36--53 62--77 17--61
## [51] 7--68 29--46 44--53 18--58 12--16 42--72 32--52 21--58 17--38 15--51
## [61] 7--22 22--69 5--13 2--29 12--77 35--37 18--46 10--71 22--47 19--20
## [71] 19--31 13--68 49--69 30--63 5--49 53--75 57--62 73--81 29--69 40--71
## [81] 19--58 42--49 5--37 2--18 20--80 53--75 15--54 58--76 23--40 5--12
## + ... omitted several edges
#adjacency matrix from igraph object
UKfaculty.adjacency <- as_adj(UKfaculty.igraph)</pre>
head(UKfaculty.adjacency)
## 6 x 81 sparse Matrix of class "dgCMatrix"
## [5,] . . . . . 1 1 . 1 1 . 1 1 . . 1 . . . . . 1 1 . . . . 1 1 . . . . . . . . . . . . . . 1
## [5,] 1 . 1 . 1 . . . . . . 1 1 1 . 1 . . . . . . . . . 1 . . 1 1 . 1 1 1 . . 1 . .
##
## [1,] . . . . . .
## [2,] . . . . 1 1 .
## [3,] . . . . . .
## [4,] 1 . . 1 . . .
## [5,] . 1 1 . . . .
## [6,] . . . . . .
UKfaculty.adjacency2 <- as_adj(UKfaculty)</pre>
head(UKfaculty.adjacency2)
```

```
## 6 x 81 sparse Matrix of class "dgCMatrix"
##
##
 [1,] . . . 1 . . . . . . . . . .
## [2,]
          . . . . . . . 1 . . 1 . . 1 . . . 1 . . . 1 . 1 . . 1 . 1
          ## [3,]
## [4,] 1 . 1 . . .
   ## [6,] . .
           1
##
##
                 [1,] . . . . . . 1 1 . . . . . .
   ## [3,]
           . . . . . . . 1 . . . . . 1 .
##
## [1,] . . . . . .
## [2,] . . . 1 1 .
## [3,]
   . . . . . . .
## [4,] 1 . . 1 .
## [5,] . 1 1 . . . .
## [6,] . . . . . .
```

Adjacency Matrix Visualization

```
image(Matrix(UKfaculty.adjacency))
```



Dimensions: 81 x 81

Save the igraph object

```
# Save an object to a file
saveRDS(UKfaculty.igraph, file = "../data/my_UKfaculty_igraph.rds")
# Restore the object
my_UKfaculty <- readRDS(file = "../data/my_UKfaculty_igraph.rds")</pre>
my_UKfaculty
## IGRAPH 877eba7 D--- 81 817 --
## + edges from 877eba7:
## [1] 57->52 76->42 12->69 43->34 28->47 58->51 7->29 40->71 5->37 48->55
## [11] 6->58 21-> 8 28->69 43->21 67->58 65->42 5->67 52->75 37->64 4->36
## [21] 12->49 19->46 37-> 9 74->36 62-> 1 15-> 2 72->49 46->62 2->29 40->12
## [31] 22->29 71->69 4-> 3 37->69 5-> 6 77->13 23->49 52->35 20->14 62->70
## [41] 34->35 76->72 7->42 37->42 51->80 38->45 62->64 36->53 62->77 17->61
## [51] 7->68 46->29 44->53 18->58 12->16 72->42 52->32 58->21 38->17 15->51
## [61] 22-> 7 22->69    5->13 29-> 2 77->12 37->35 18->46 10->71 22->47 20->19
## [71] 19->31 68->13 49->69 30->63 5->49 53->75 62->57 73->81 29->69 71->40
## [81] 19->58 49->42 37-> 5 18-> 2 20->80 75->53 15->54 76->58 40->23 5->12
## + ... omitted several edges
```