

Assignment

Meta Infos

Student:in	Jonathan Baß
Titel	Hier könnte der Titel ihrer Arbeit stehen!
Kurskontext	Social Network Analysis
Datum	insertdate
Dozent	Philipp M. Mendoza, M.Sc.

Für weitere Anleitungen und Tipps siehe den Syllabus und den Eintrag zur Portfolioprüfung.

Wichtig: das ganze sollte in der Form eines Blogpostes geschrieben sein; sprich ein Fließtext! Nachfolgend ein Vorschlag der Strukturierung eurer Arbeit; in jedem Report sollten *zumindest* die hier angeführten Punkte abgedeckt werden.

Executive Summary

Dies ist die einzige Sektion die in Bullet points angeführt werden soll.

- Forschungsfrage
- Datensatz
- Strategie
- Ergebnisse

Einleitung und Fragestellung

- Thema
- Daten
- Forschungsfrage
- Relevanz der Forschungsfrage (“*so what?*”)

Analysestrategie

- Operationalisierung eurer Forschungsfrage (welche Maße verwendet ihr um eure Forschungsfrage zu beantworten und warum?)
- Charakterisierung des Netzwerks
- Kontext der verwendeten Daten

Umsetzung

- Datenmanipulationen
- Erklärung der Schritte
- Interpretation der Visualisierungen

Conclusio

- Wiederholung der Fragestellung
- Zusammenfassung der zentralen Ergebnisse
- (*Limitationen, weiterführende Kommentare, etc.*)

|—————|

Install packages

```
# install.packages("igraph", dependencies = T)
# install.packages("igraphdata", dependencies = T)
# install.packages("tidygraph", dependencies = T)
# install.packages("tidyverse", dependencies = T)
# install.packages("ggraph", dependencies = T)
# install.packages("ggthemes", dependencies = TRUE) # a collection of a lot of themes for dataviz!
# install.packages("gganimate", dependencies = TRUE) # an dynamic animation package
# install.packages("gifski", dependencies = TRUE) # an engine to render gifs
# install.packages("rnetcarto", dependencies = TRUE)
```

Setup libraries

```
library(igraph)

##
## Attache Paket: 'igraph'

## Das folgende Objekt ist maskiert 'package:tidygraph':
##
##      groups

## Die folgenden Objekte sind maskiert von 'package:dplyr':
##
##      as_data_frame, groups, union

## Die folgenden Objekte sind maskiert von 'package:purrr':
##
##      compose, simplify

## Das folgende Objekt ist maskiert 'package:tidyr':
##
##      crossing

## Das folgende Objekt ist maskiert 'package:tibble':
##
##      as_data_frame
```

```
## Die folgenden Objekte sind maskiert von 'package:stats':
##
##     decompose, spectrum

## Das folgende Objekt ist maskiert 'package:base':
##
##     union
```

```
library(igraphdata)

library(ggraph)
library(ggthemes)
library(gganimate)
library(gifski)

library(tidyverse)
library(tidygraph)

library(RColorBrewer)
library(rnetcarto)
```

Remove old data

```
rm(list = ls())
```

Initialize data

```
data("rfid")
#rfid
```

Remove loops as well as directional data and store as dataframe

```
df <- as.undirected(simplify(rfid))
#df
```

Identify roles

```
df.mat=as_adjacency_matrix(df, sparse = F)
head(df.mat, 1)
```

```
##      [,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10] [,11] [,12] [,13] [,14]
## [1,]    0    1    1    1    1    1    1    1    1    1    1    1    1    1
##      [,15] [,16] [,17] [,18] [,19] [,20] [,21] [,22] [,23] [,24] [,25] [,26]
## [1,]    1    1    1    1    1    1    1    1    1    1    1    1
```

```
##      [,27] [,28] [,29] [,30] [,31] [,32] [,33] [,34] [,35] [,36] [,37] [,38]
## [1,]      1      1      1      1      1      0      1      0      1      1      1      0
##      [,39] [,40] [,41] [,42] [,43] [,44] [,45] [,46] [,47] [,48] [,49] [,50]
## [1,]      0      1      1      1      1      0      1      1      1      1      1      0
##      [,51] [,52] [,53] [,54] [,55] [,56] [,57] [,58] [,59] [,60] [,61] [,62]
## [1,]      1      1      1      1      1      0      0      1      0      1      0      1
##      [,63] [,64] [,65] [,66] [,67] [,68] [,69] [,70] [,71] [,72] [,73] [,74]
## [1,]      1      1      1      0      1      1      1      0      1      1      1      1
##      [,75]
## [1,]      0
```

Add professions from dataframe

```
rnc=netcarto(df.mat)
rnc
```

```
## [[1]]
##      name module connectivity participation      role
## 59      59      0 -1.84242376      0.6562500 Connector
## 75      75      0 -1.45919962      0.6115702 Peripheral
## 60      60      0 -1.26758755      0.6428571 Connector
## 56      56      0 -1.07597548      0.6222222 Connector
## 54      54      0 -0.88436340      0.6093750 Peripheral
## 61      61      0 -0.88436340      0.6171875 Peripheral
## 72      72      0 -0.88436340      0.6481481 Connector
## 44      44      0 -0.88436340      0.6900000 Connector
## 74      74      0 -0.69275133      0.6394558 Connector
## 53      53      0 -0.69275133      0.6805293 Connector
## 42      42      0 -0.50113926      0.6982249 Connector
## 55      55      0 -0.30952719      0.5804989 Peripheral
## 51      51      0 -0.11791512      0.7180900 Connector
## 31      31      0  0.07369695      0.6352041 Connector
## 62      62      0  0.07369695      0.6894531 Connector
## 57      57      0  0.45692109      0.4421488 Peripheral
## 36      36      0  0.64853316      0.5541838 Peripheral
## 20      20      0  0.64853316      0.7149811 Connector
## 19      19      0  0.64853316      0.7279012 Connector
## 21      21      0  1.03175731      0.7135417 Connector
## 10      10      0  1.22336938      0.6662701 Connector
## 25      25      0  1.22336938      0.6857761 Connector
## 26      26      0  1.22336938      0.7122032 Connector
## 64      64      0  1.22336938      0.7135717 Connector
## 17      17      0  1.22336938      0.7325331 Connector
## 23      23      0  1.79820559      0.7211653 Connector
## 58      58      1 -1.99485464      0.5000000 Peripheral
## 46      46      1 -1.76816661      0.6419753 Connector
## 71      71      1 -1.54147858      0.6200000 Connector
## 14      14      1 -1.08810253      0.6632653 Connector
## 39      39      1 -1.08810253      0.7396694 Connector
## 73      73      1 -0.63472647      0.7078189 Connector
## 28      28      1  0.04533761      0.6527778 Connector
## 9       9       1  0.04533761      0.7011719 Connector
```

```

## 12 12 1 0.04533761 0.7107438 Connector
## 63 63 1 0.04533761 0.7111111 Connector
## 65 65 1 0.27202563 0.5909091 Peripheral
## 48 48 1 0.27202563 0.7129291 Connector
## 18 18 1 0.49871366 0.6144000 Peripheral
## 30 30 1 0.72540169 0.7055324 Connector
## 16 16 1 0.72540169 0.7182261 Connector
## 35 35 1 0.72540169 0.7188366 Connector
## 11 11 1 0.95208971 0.7272000 Connector
## 13 13 1 0.95208971 0.7326389 Connector
## 15 15 1 1.40546577 0.7176931 Connector
## 1 1 1 1.40546577 0.7331363 Connector
## 66 66 2 -2.08237441 0.6913580 Connector
## 70 70 2 -1.18992823 0.5400000 Peripheral
## 32 32 2 -1.18992823 0.6836735 Connector
## 40 40 2 -0.74370515 0.7091413 Connector
## 38 38 2 -0.29748206 0.5680473 Peripheral
## 34 34 2 -0.29748206 0.6484375 Connector
## 3 3 2 -0.29748206 0.7434842 Connector
## 69 69 2 0.14874103 0.7069943 Connector
## 45 45 2 0.14874103 0.7364664 Connector
## 49 49 2 0.14874103 0.7387543 Connector
## 8 8 2 0.59496412 0.5761773 Peripheral
## 5 5 2 1.04118721 0.7325620 Connector
## 24 24 2 1.04118721 0.7456790 Connector
## 6 6 2 1.48741029 0.7407407 Connector
## 37 37 2 1.48741029 0.7417092 Connector
## 67 67 3 -1.88120902 0.6938776 Connector
## 47 47 3 -1.23884496 0.7218935 Connector
## 68 68 3 -1.23884496 0.7448015 Connector
## 50 50 3 -0.59648091 0.6848073 Connector
## 41 41 3 -0.59648091 0.7066116 Connector
## 43 43 3 -0.59648091 0.7296786 Connector
## 52 52 3 0.04588315 0.7372449 Connector
## 2 2 3 0.36706517 0.7321429 Connector
## 4 4 3 0.36706517 0.7456747 Connector
## 33 33 3 0.68824720 0.7462500 Connector
## 7 7 3 1.00942923 0.7325331 Connector
## 22 22 3 1.00942923 0.7350000 Connector
## 29 29 3 1.33061126 0.7404337 Connector
## 27 27 3 1.33061126 0.7488546 Connector
##
## [[2]]
## [1] 0.1037241

```

Number of modules

```

df %>% as_tbl_graph() %>% activate(nodes) %>% mutate(name = row_number()) -> klm
klm

```

```

## # A tbl_graph: 75 nodes and 1139 edges
## #

```

```
## # An undirected simple graph with 1 component
## #
## # Node Data: 75 x 2 (active)
##   Status  name
##   <chr>   <int>
## 1 ADM      1
## 2 NUR      2
## 3 NUR      3
## 4 NUR      4
## 5 NUR      5
## 6 NUR      6
## # ... with 69 more rows
## #
## # Edge Data: 1,139 x 2
##   from  to
##   <int> <int>
## 1     1   2
## 2     1   3
## 3     1   4
## # ... with 1,136 more rows
```

Plot

```
test <- merge(x = klm , y = rnc[[1]], by = "name", all = TRUE)
head(test, 10)
```

	name	Status	module	connectivity	participation	role
## 1	1	ADM	1	1.40546577	0.7331363	Connector
## 2	2	NUR	3	0.36706517	0.7321429	Connector
## 3	3	NUR	2	-0.29748206	0.7434842	Connector
## 4	4	NUR	3	0.36706517	0.7456747	Connector
## 5	5	NUR	2	1.04118721	0.7325620	Connector
## 6	6	NUR	2	1.48741029	0.7407407	Connector
## 7	7	NUR	3	1.00942923	0.7325331	Connector
## 8	8	NUR	2	0.59496412	0.5761773	Peripheral
## 9	9	MED	1	0.04533761	0.7011719	Connector
## 10	10	NUR	0	1.22336938	0.6662701	Connector

Plot

```
ggplot(test, aes(y = connectivity, x = participation)) +
  geom_point(aes(color=Status, shape=role, size=module))
```

