

Data Science Basics

Introduction (UN Votings)
Prof. Dr. Jan Kirenz

Data science

The following content is based on Mine Çetinkaya-Rundel's excellent book Data Science in a Box

- Data science is an exciting discipline that allows you to turn raw data into understanding, insight, and knowledge.
- The focus of our course is on **data wrangling** and **modeling**.

Software

AutoSave OFF

unvotes — Saved to my Mac

Home Insert Page Layout Formulas Data Review View Table

F17 X ✓ fx | 0

	A	B	C	D	E	F	G	H	I	J	K
1	rcid	country	country_code	vote	session	importantvote	date	unres	amend	para	short
2	6	US	US	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
3	6	Canada	CA	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
4	6	Cuba	CU	yes	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
5	6	Dominican Republic	DO	abstain	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
6	6	Mexico	MX	yes	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
7	6	Guatemala	GT	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
8	6	Honduras	HN	yes	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
9	6	El Salvador	SV	abstain	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
10	6	Nicaragua	NI	yes	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
11	6	Panama	PA	abstain	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
12	6	Colombia	CO	abstain	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
13	6	Venezuela, Bolivarian Republic of	VE	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
14	6	Ecuador	EC	yes	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
15	6	Peru	PE	yes	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
16	6	Brazil	BR	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
17	6	Bolivia (Plurinational State of)	BO	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
18	6	Paraguay	PY	abstain	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
19	6	Chile	CL	yes	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
20	6	Argentina	AR	abstain	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
21	6	Uruguay	UY	yes	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
22	6	UK & NI	GB	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
23	6	Netherlands	NL	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
24	6	Belgium	BE	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
25	6	Luxembourg	LU	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
26	6	France	FR	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
27	6	Poland	PL	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
28	6	Czechoslovakia	CS	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
29	6	Yugoslavia	YU	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
30	6	Greece	GR	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
31	6	Russian Federation	RU	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
32	6	Ukraine	UA	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
33	6	Belarus	BY	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
34	6	Norway	NO	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS
35	6	Denmark	DK	no	1	0	04/01/1946	R/1/107	0	0	DECLARATION OF HUMAN RIGHTS

unvotes +

Ready 130%

R Console

R version 4.0.2 (2020-06-22) -- "Taking Off Again"
Copyright (C) 2020 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin17.0 (64-bit)

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'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[R.app GUI 1.72 (7847) x86_64-apple-darwin17.0]
[History restored from /Users/mine/.Rapp.history]

> |

academy-launch - master - RStudio

unvotes

Filter

rqid	country	country_code	vote	session	importantvote	date	unres	amend	para	short
1	US	US	no	1	0	04/01/1946	R/1/107	0	0	DECLA
2	Canada	CA	no	1	0	04/01/1946	R/1/107	0	0	DECLA
3	Cuba	CU	yes	1	0	04/01/1946	R/1/107	0	0	DECLA
4	Dominican Republic	DO	abstain	1	0	04/01/1946	R/1/107	0	0	DECLA
5	Mexico	MX	yes	1	0	04/01/1946	R/1/107	0	0	DECLA
6	Guatemala	GT	no	1	0	04/01/1946	R/1/107	0	0	DECLA
7	Honduras	HN	yes	1	0	04/01/1946	R/1/107	0	0	DECLA
8	El Salvador	SV	abstain	1	0	04/01/1946	R/1/107	0	0	DECLA
9	Nicaragua	NI	yes	1	0	04/01/1946	R/1/107	0	0	DECLA
10	Panama	PA	abstain	1	0	04/01/1946	R/1/107	0	0	DECLA
11	Colombia	CO	abstain	1	0	04/01/1946	R/1/107	0	0	DECLA
12	Venezuela, Bolivarian Republic of	VE	no	1	0	04/01/1946	R/1/107	0	0	DECLA
13	Ecuador	EC	yes	1	0	04/01/1946	R/1/107	0	0	DECLA
14	Peru	PE	yes	1	0	04/01/1946	R/1/107	0	0	DECLA
15	Brazil	BR	no	1	0	04/01/1946	R/1/107	0	0	DECLA
16	Bolivia (Plurinational State of)	BO	no	1	0	04/01/1946	R/1/107	0	0	DECLA
17	Paraguay	PY	abstain	1	0	04/01/1946	R/1/107	0	0	DECLA
18	Chile	CL	yes	1	0	04/01/1946	R/1/107	0	0	DECLA
19	Argentina	AR	abstain	1	0	04/01/1946	R/1/107	0	0	DECLA
20	Uruguay	UY	yes	1	0	04/01/1946	R/1/107	0	0	DECLA

Showing 1 to 20 of 768,674 entries, 14 total columns

Console Terminal Jobs

/Desktop/academy-launch/

```
R version 4.0.2 (2020-06-22) -- "Taking Off Again"
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'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
```

academy-launch

Environment History Connections Git Tutorial

Import Dataset Global Environment

unvotes 768674 obs. of 14 variables

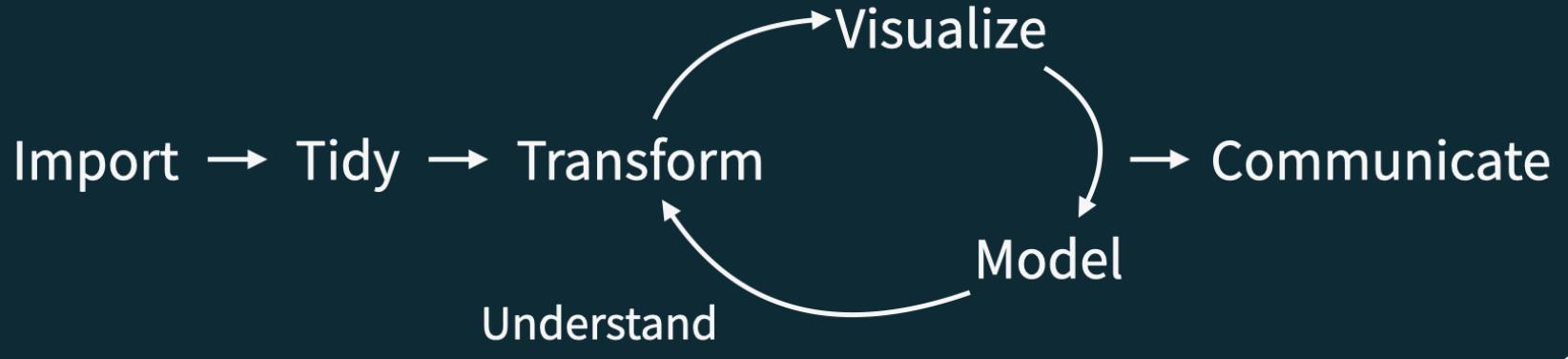
Files Plots Packages Help Viewer

New Folder Delete Rename More

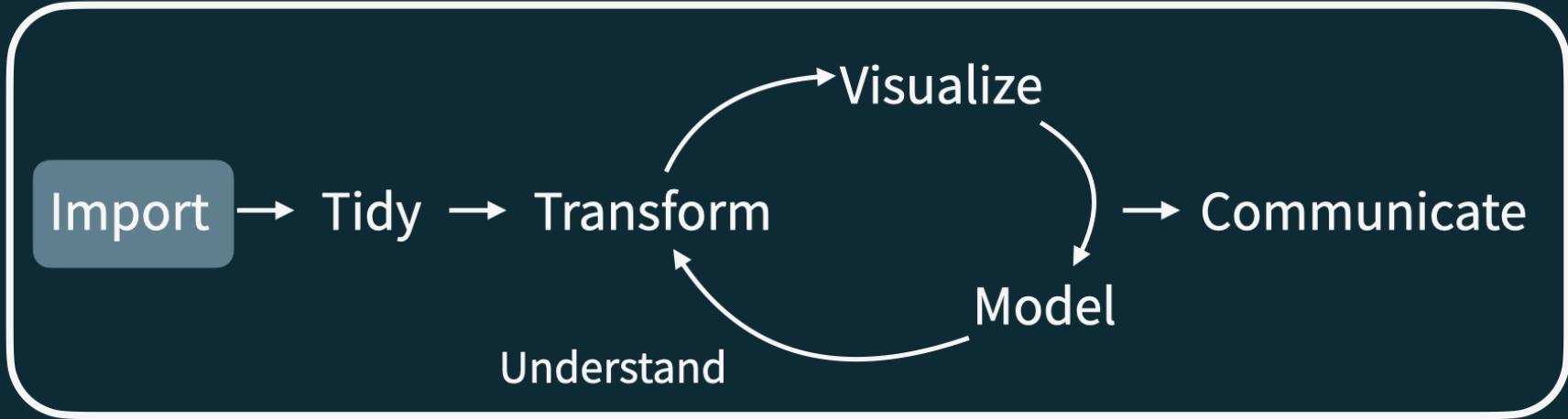
Home > Desktop > academy-launch

Name	Size	Modified
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.gitignore	29 B	Aug 18, 2020, 10:18
academy-launch.Rproj	235 B	Aug 18, 2020, 10:32
data		
unvotes.Rmd	2.8 KB	Aug 17, 2020, 2:01

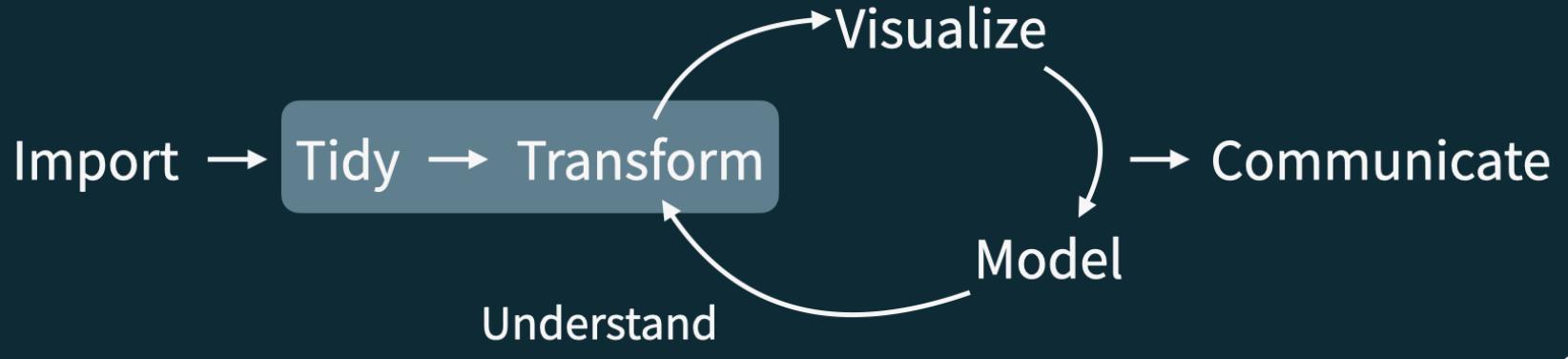
Data science life cycle



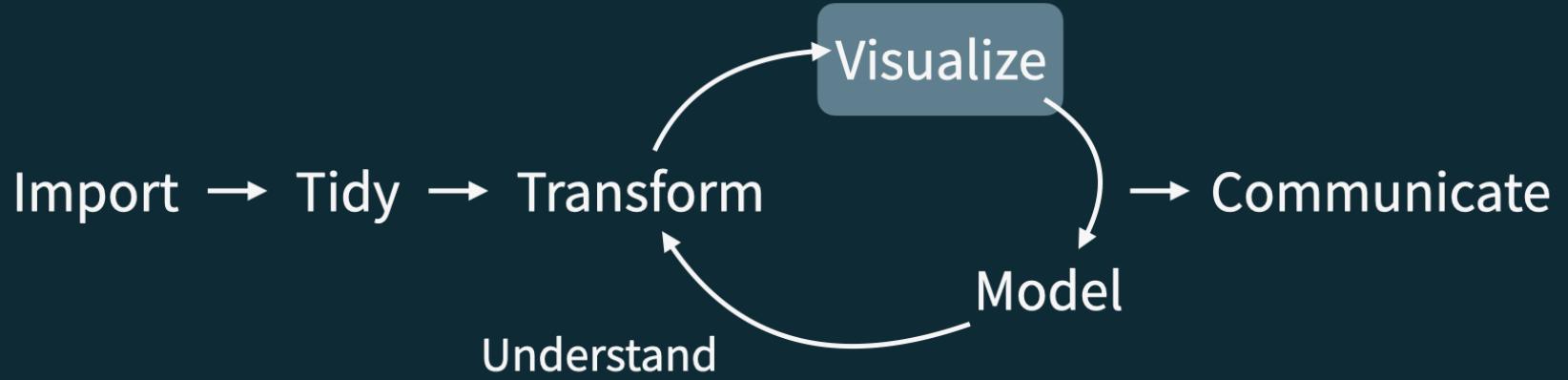
Program



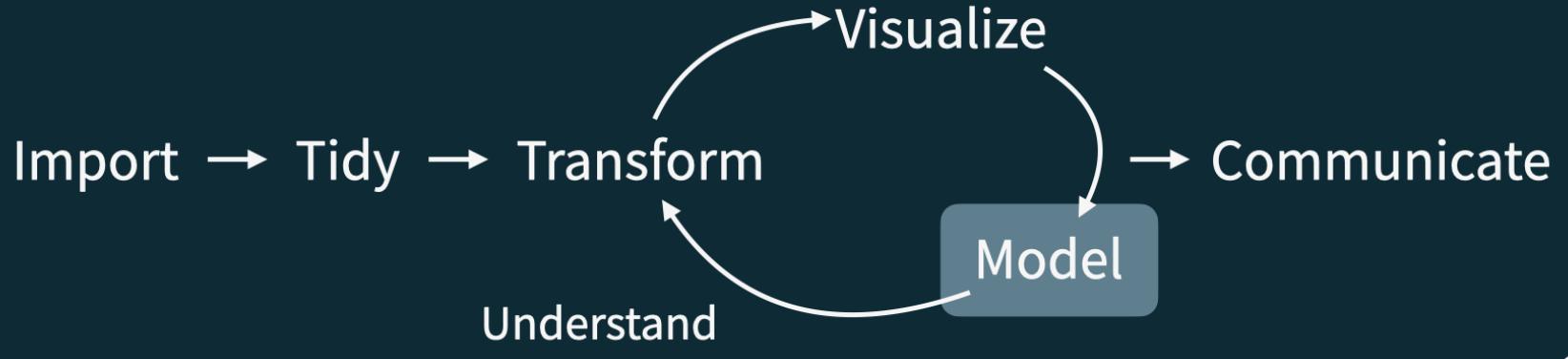
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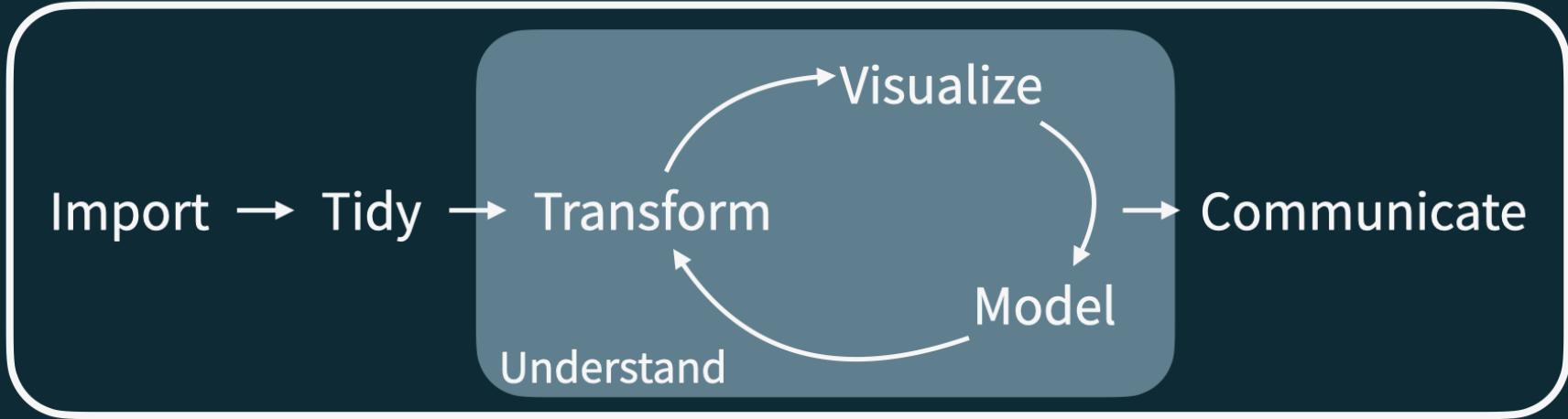
Program



Program

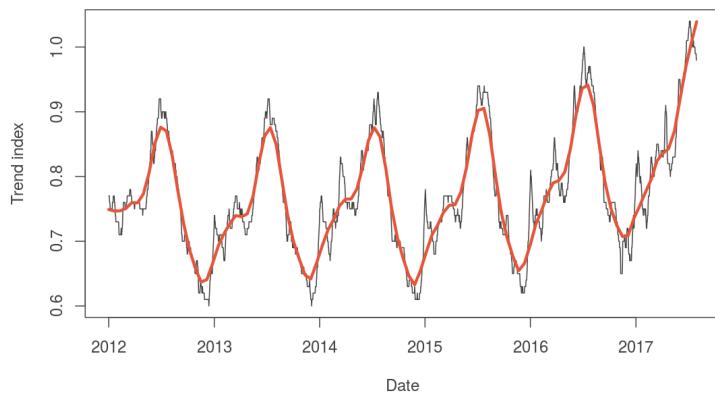
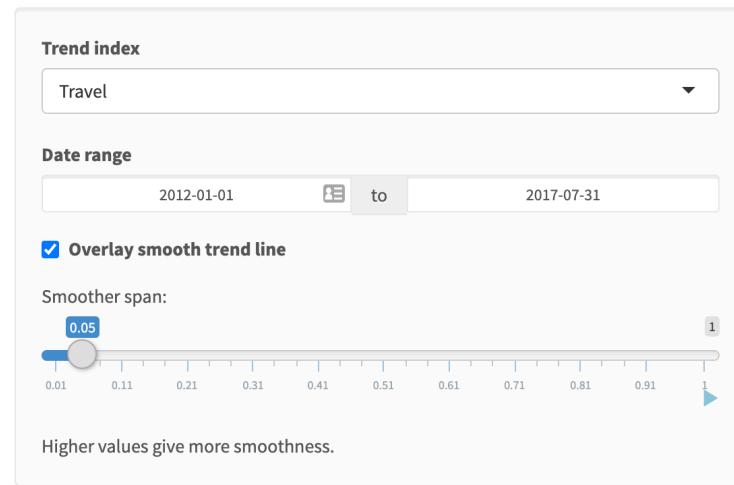


Program



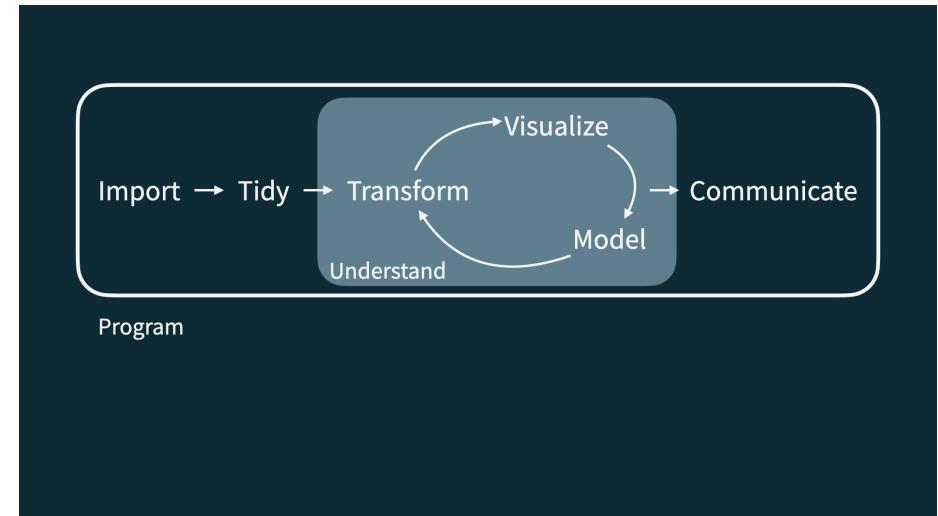
Program

Google Trend Index

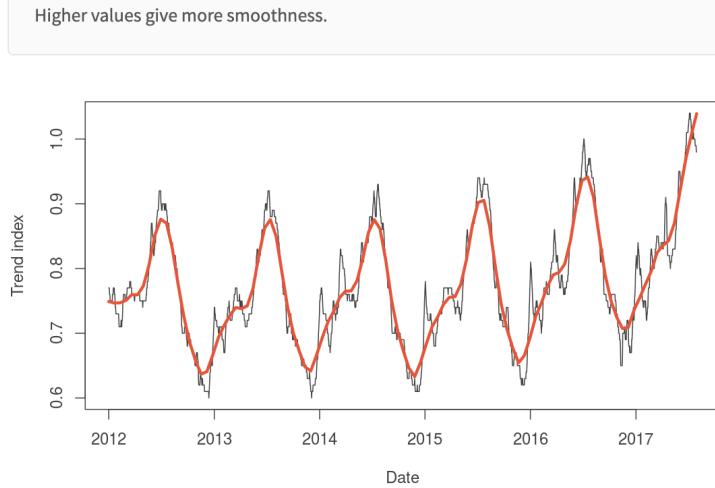


The Google Travel Index tracks queries related to airlines, hotels, beach, southwest, las vegas, flights, etc. The index is set to 1.0 on January 1, 2004 and is calculated only for US search traffic.

Source: Google Domestic Trends

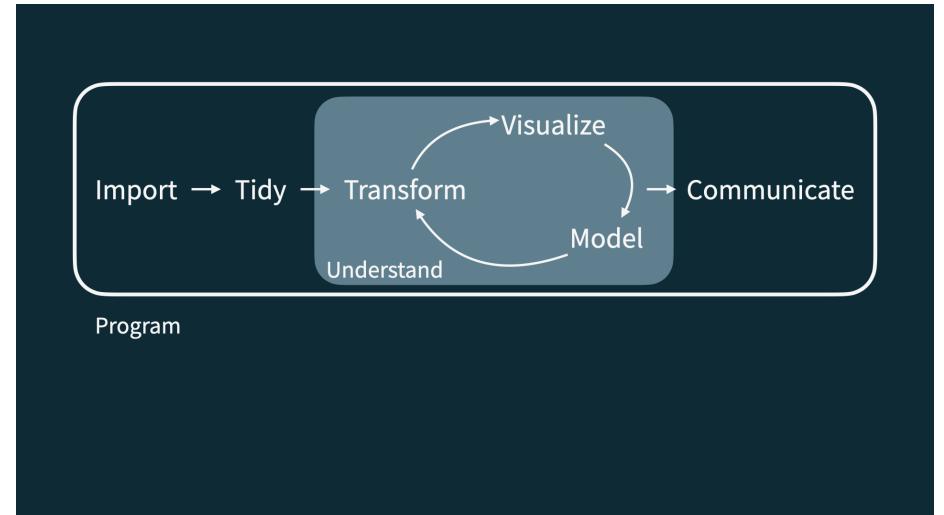


Google Trend Index

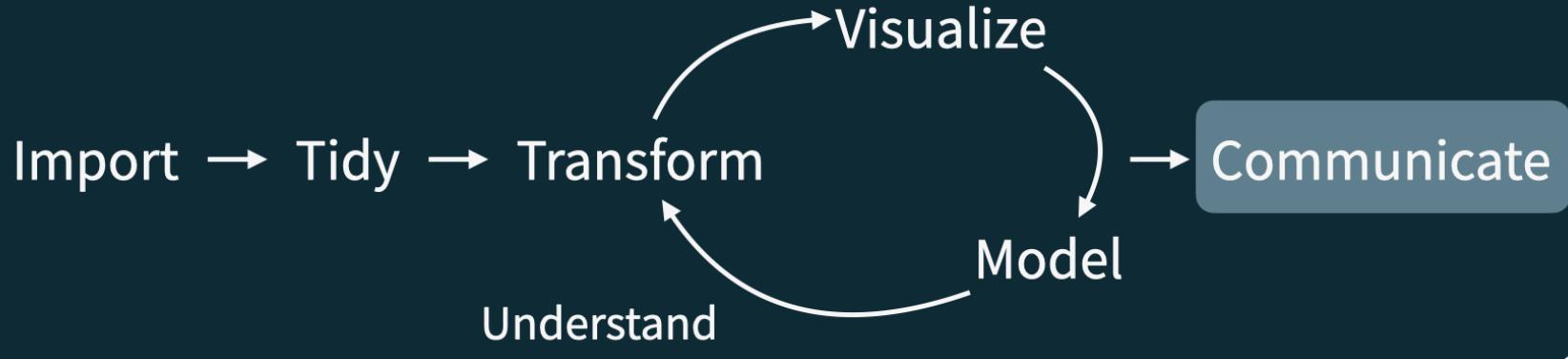


The Google Travel Index tracks queries related to airlines, hotels, beach, southwest, las vegas, flights, etc. The index is set to 1.0 on January 1, 2004 and is calculated only for US search traffic.

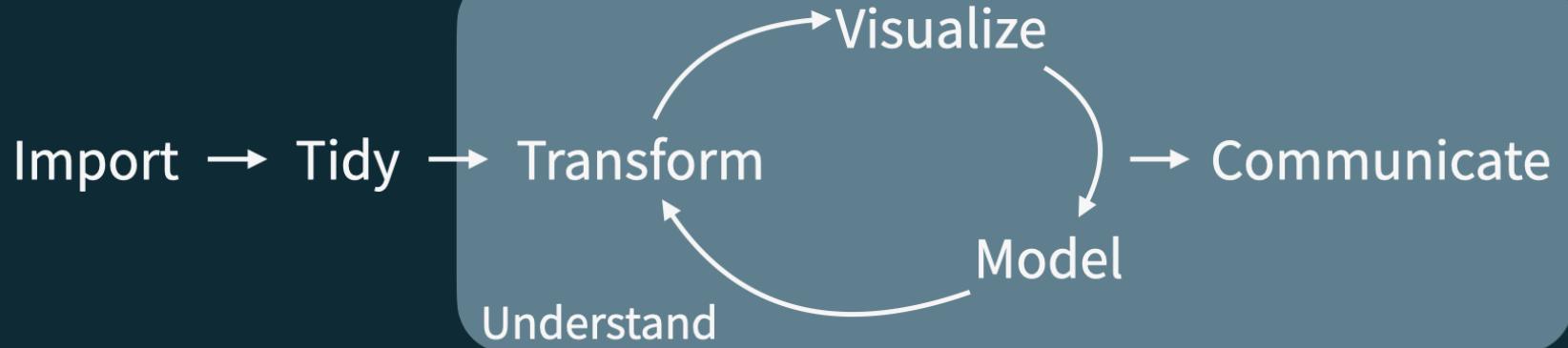
Source: [Google Domestic Trends](#)



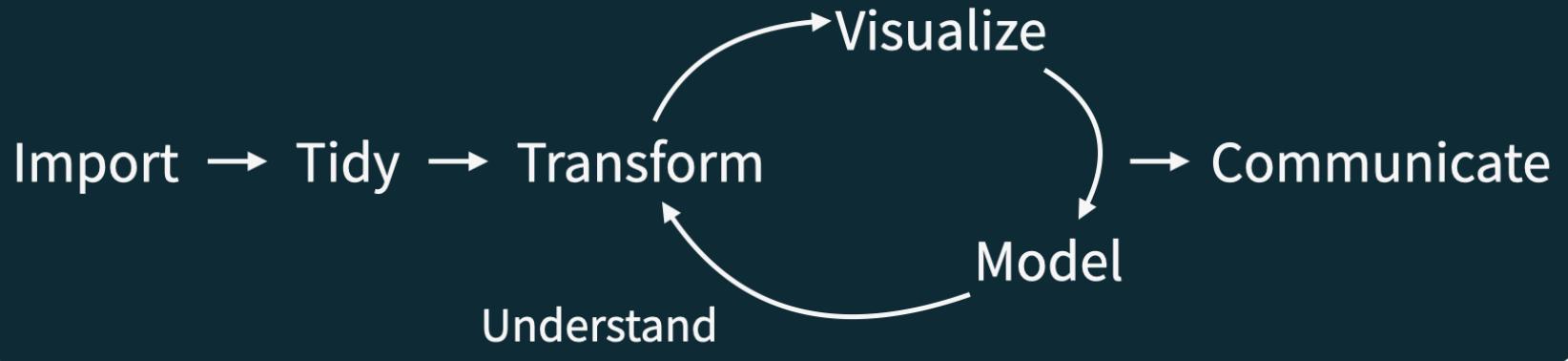
```
## # A tibble: 5 x 2
##   date      season
##   <chr>     <chr>
## 1 23 January 2017 winter
## 2 4 March 2017 spring
## 3 14 June 2017 summer
## 4 1 September 2017 fall
## 5 ...
```



Program



Program



Program

academy-search master · GitHub

File · File · Packages · Help · Viewer

0

UN Votes

Mine Çetinkaya-Rundel
2020-08-18

Introduction

How do various countries vote in the United Nations General Assembly, how have their voting patterns evolved throughout time, and how similarly or differently do they view certain issues? Answering these questions (at a high level) is the focus of this analysis.

We will use the `tidyverse`, `lubridate`, and `scales` packages for the data wrangling and visualization, and the `DT` package for interactive display of tabular output. The data we're using come from the `unvotes` package.

```
1 <-- library(tidyverse)
2 <-- library(lubridate)
3 <-- library(scales)
4 <-- library(DT)
5 <-- library(unvotes)
```

UN voting patterns

Let's create a data visualization that displays how the voting record of the UK & NL changed over time on a variety of issues, and compares it to two other countries: US and Turkey.

We can easily change which countries are being plotted by changing which country names in the code above. This is for. Note that the country name should be spelled and capitalized exactly the same way as it appears in the data. See the [Appendix](#) for a list of the countries in the data.

```
1 <-- plot_ply_yearly_pie(issue, fig.width=10, fig.height=6, message=FALSE)
2 un_votes %>
3   mutate(
4     country =
5     case_when(
6       country == "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
7       country == "United States of America" ~ "USA",
8       TRUE ~ country
9     )
10   ) %>
11   inner_join(un_vote_table, by = "issue") %>
```

Introduction

UN voting patterns

References

Appendix

Libraries

- tidyverse
- lubridate
- scales
- DT
- unvotes

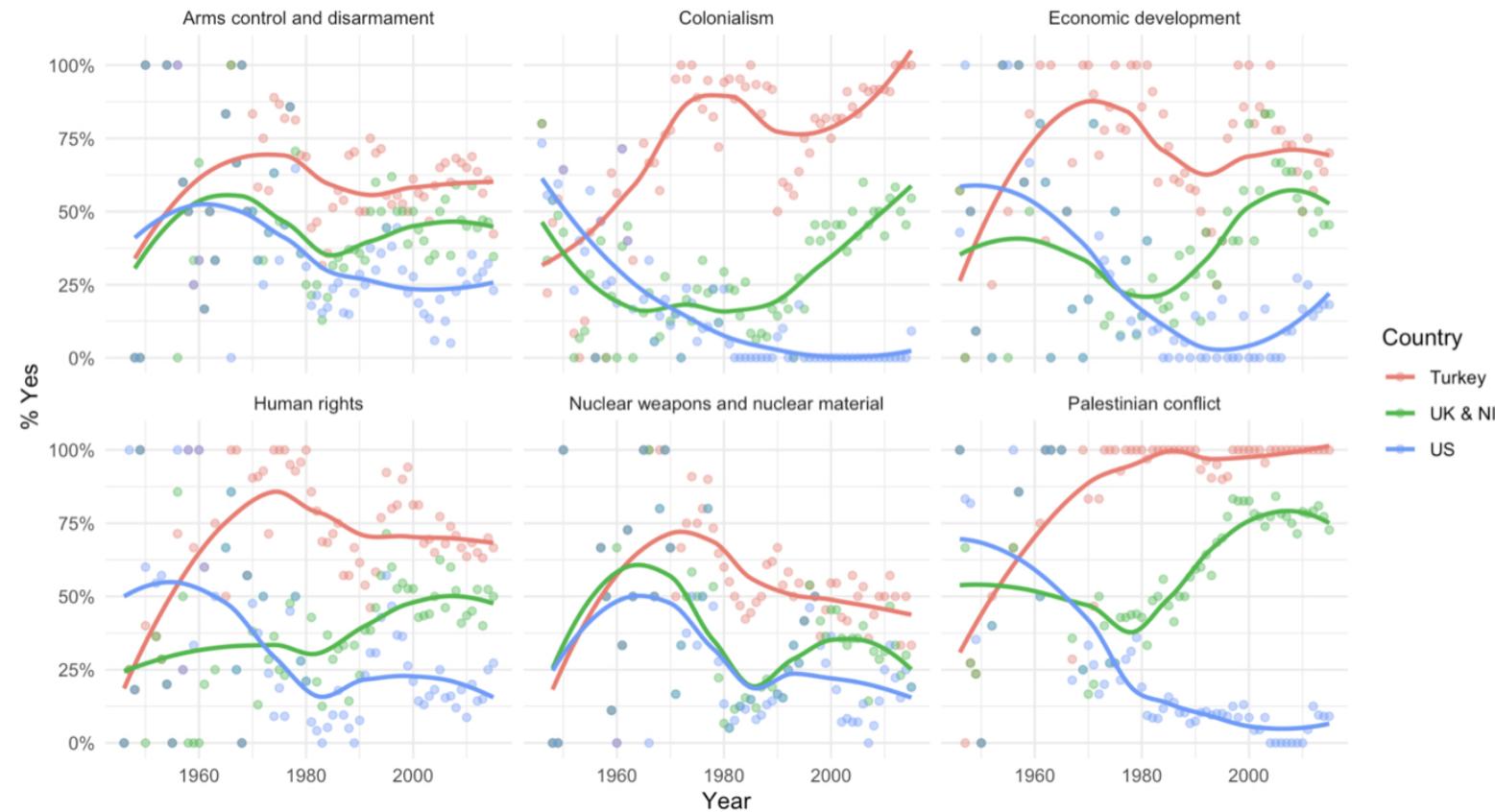
```
un_votes %>
  mutate(
    country =
    case_when(
      country == "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
      country == "United States of America" ~ "USA",
      TRUE ~ country
    )
  ) %>
  inner_join(un_vote_table, by = "issue") %>
  inner_join(un_vote_table, by = "issue") %>
  group_by(issue, year, country) %>
  summarise(pie_pct = nunique(issue) ~ "year")) %>
  mutate(mapping = issue ~ year, y = percent_pie..value ~ country) %>
  ggplot(mapping = y ~ issue, fill = "white") +
  facet_wrap(mapping ~ country) +
  scale_y_continuous(limits = percent) +
  labs(
    title = "Percentage of 'Yes' votes in the UN General Assembly",
    subtitle = "1945 to 2017",
    y = "Y axis",
    x = "Issue",
    color = "Country"
  )
```

Done publishing!

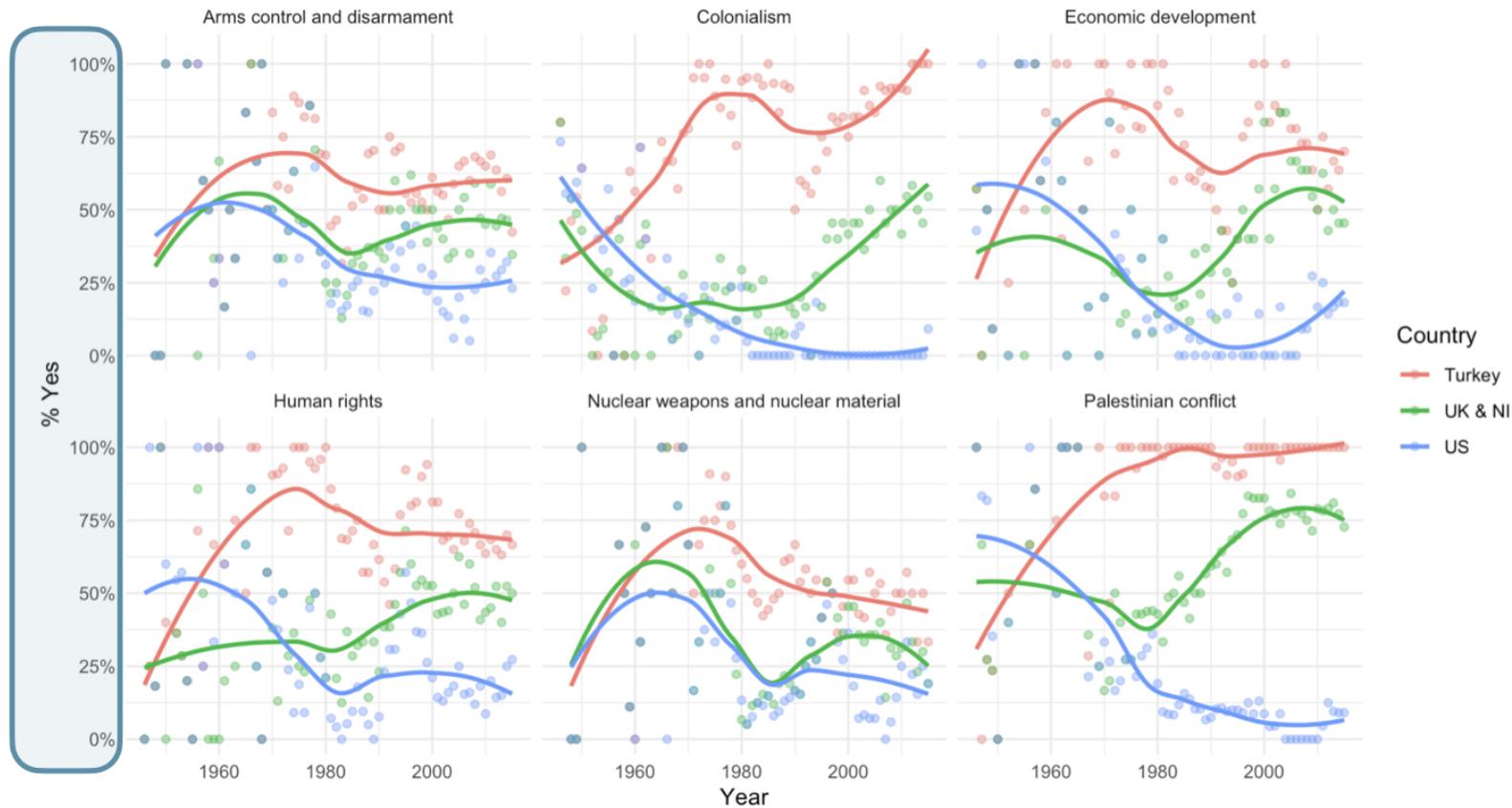
Let's dive in!



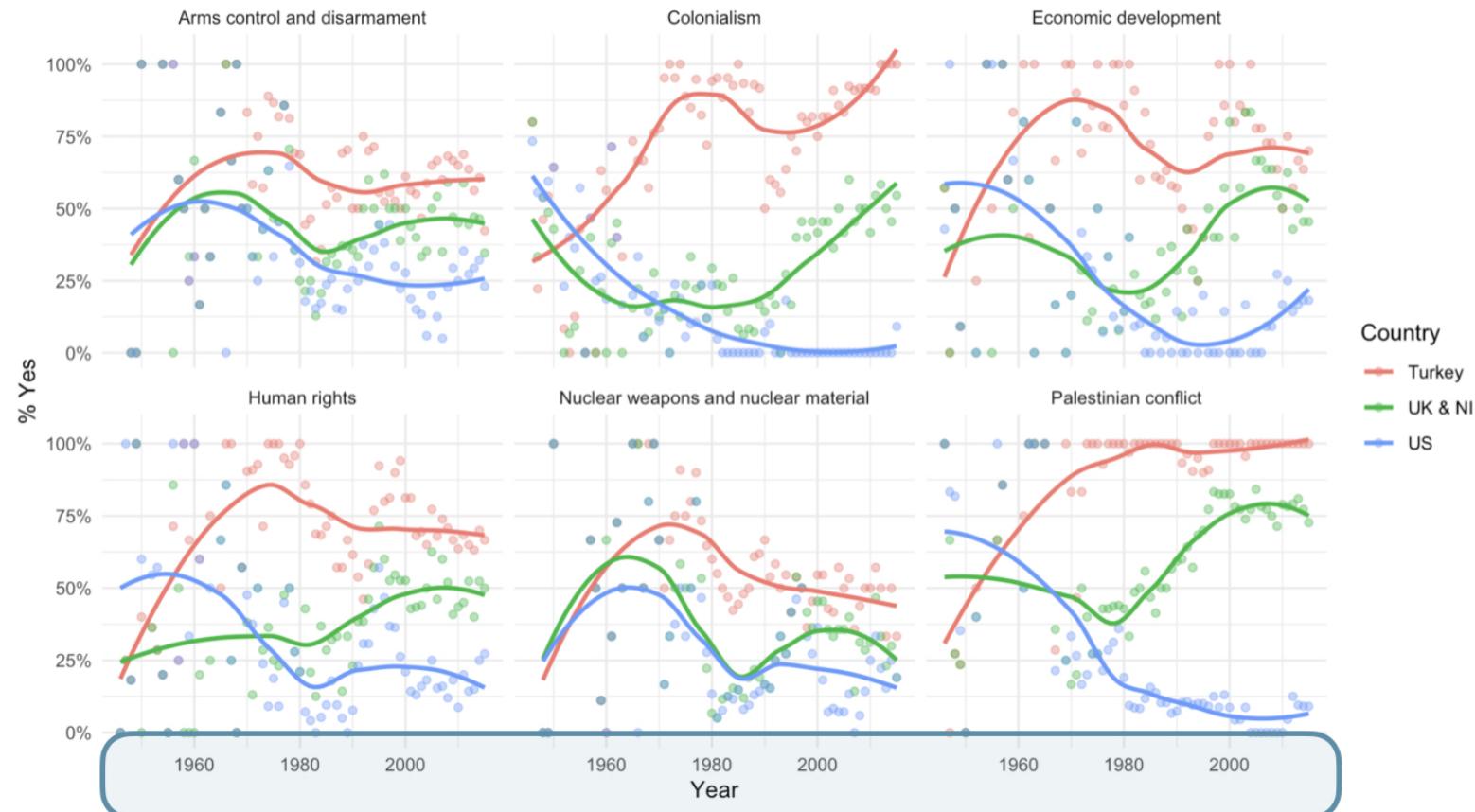
Percentage of 'Yes' votes in the UN General Assembly
1946 to 2015



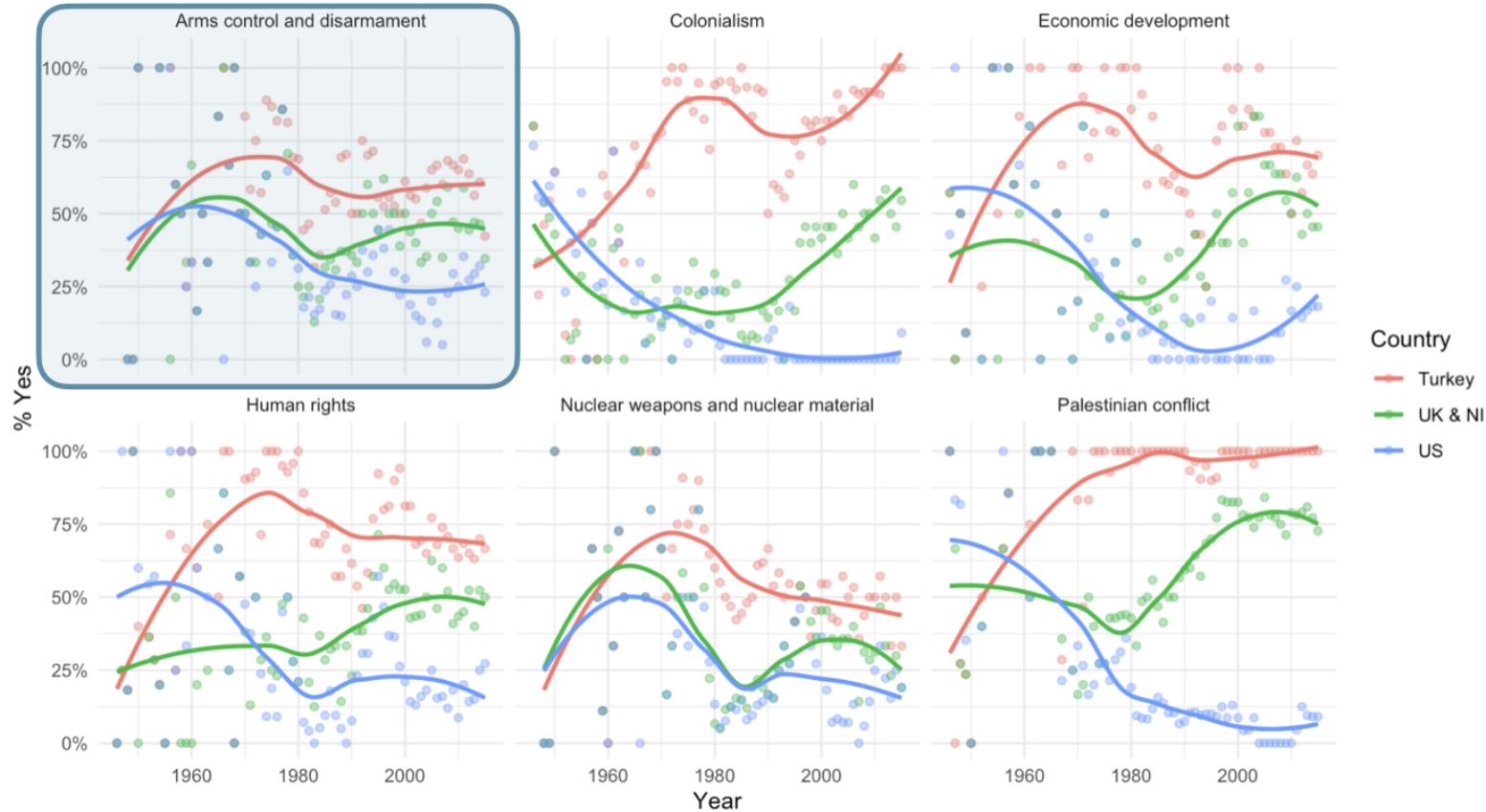
Percentage of 'Yes' votes in the UN General Assembly
1946 to 2015



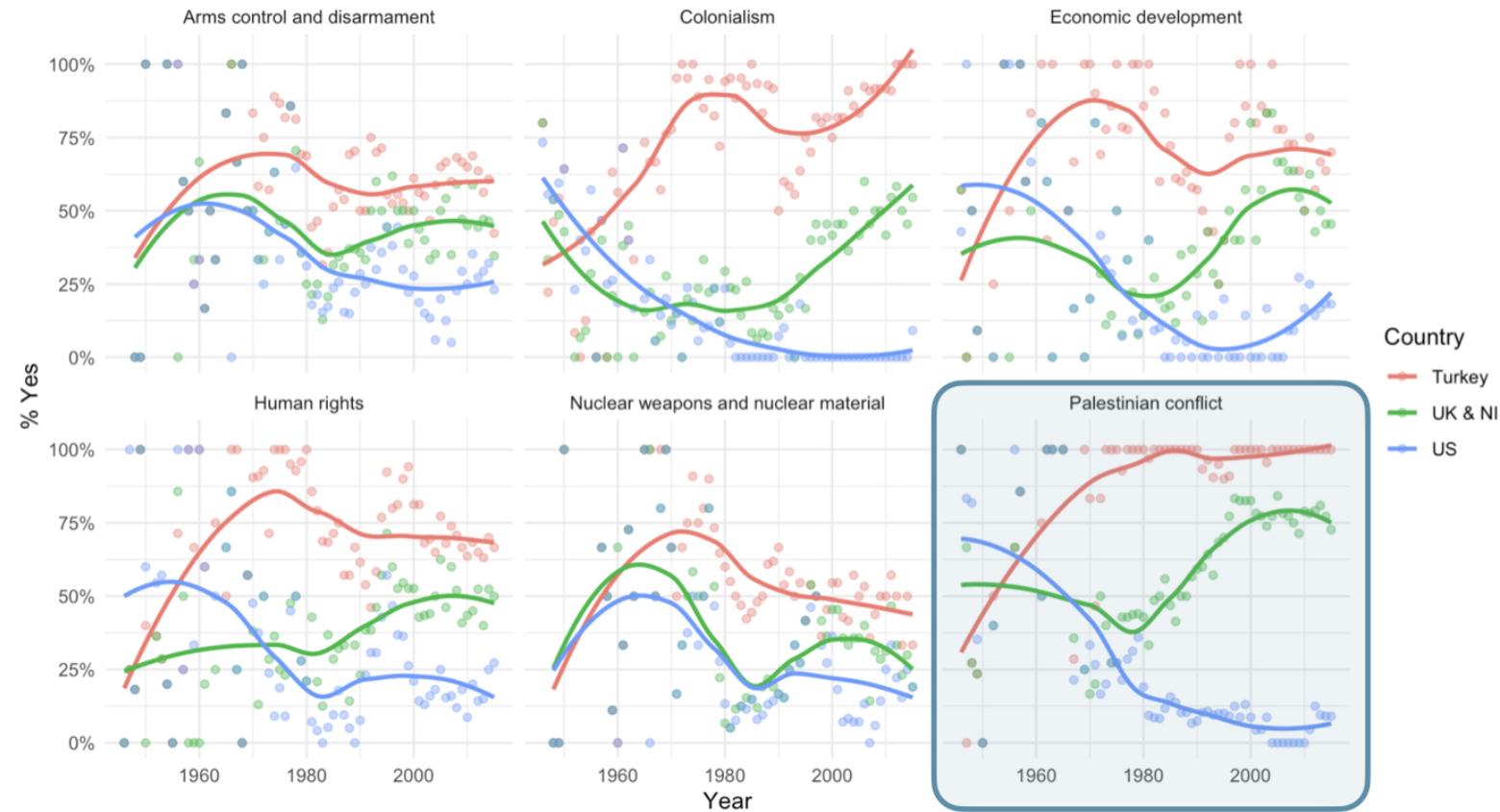
Percentage of 'Yes' votes in the UN General Assembly
1946 to 2015



Percentage of 'Yes' votes in the UN General Assembly
1946 to 2015



Percentage of 'Yes' votes in the UN General Assembly
1946 to 2015



The screenshot shows three stacked Jupyter Notebook cells. The top cell has a purple border and displays the contents of the `un_votes` table. The middle cell has a pink border and displays the contents of the `un_roll_calls` table. The bottom cell has a red border and displays the contents of the `un_roll_call_issues` table.

un_votes

	rcid	country	country_code	vote
1	1	un_votes	un_roll_calls	un_roll_call_issues
2	2			
3	3			
4	4			
5	5			
6	6			
7	7			
8	8			
9	9			
10	10			
11	11			
12	12			
13	13			
14	14			
15	15			
16	16			
17	17			
18	18			
19	19			
20	20			
21	21			
22	22			
23	23			
24	24			
25	25			
26	26			

Showing 1 to 26 of 5,281 entries, 3 total columns

un_roll_calls

	rcid	session	importantvote	date	unres	amend	para	short
1	1	un_votes	un_roll_calls	un_roll_call_issues				
2	2							
3	3							
4	4							
5	5							
6	6							
7	7							
8	8							
9	9							
10	10							
11	11							
12	12							
13	13							
14	14							
15	15							
16	16							
17	17							
18	18							
19	19							
20	20							
21	21							
22	22							
23	23							
24	24							
25	25							
26	26							

Showing 1 to 26 of 5,281 entries, 3 total columns

un_roll_call_issues

	rcid	short_name	issue
1	3372	me	Palestinian conflict
2	3658	me	Palestinian conflict
3	3692	me	Palestinian conflict
4	2901	me	Palestinian conflict
5	3020	me	Palestinian conflict
6	3217	me	Palestinian conflict
7	3298	me	Palestinian conflict
8	3429	me	Palestinian conflict
9	3558	me	Palestinian conflict
10	3625	me	Palestinian conflict
11	3714	me	Palestinian conflict
12	3368	me	Palestinian conflict
13	3410	me	Palestinian conflict
14	3539	me	Palestinian conflict
15	3634	me	Palestinian conflict
16	4880	me	Palestinian conflict
17	4126	me	Palestinian conflict
18	4078	me	Palestinian conflict
19	3016	me	Palestinian conflict
20	4290	me	Palestinian conflict
21	4717	me	Palestinian conflict
22	4790	me	Palestinian conflict
23	4483	me	Palestinian conflict
24	4555	me	Palestinian conflict
25	4646	me	Palestinian conflict
26	5020	me	Palestinian conflict

Showing 1 to 26 of 5,281 entries, 3 total columns

```
36 We can easily change which countries are being plotted by changing which
37 countries the code above `filter`'s for. Note that the country name should be
38 spelled and capitalized exactly the same way as it appears in the data. See
39 the [Appendix](#appendix) for a list of the countries in the data.
40
41 ```{r plot-yearly-yes-issue, fig.width=10, fig.height=6, message=FALSE}
42 un_votes %>%
43   mutate(
44     country =
45     case_when(
46       country == "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
47       country == "United States of America" ~ "US",
48       TRUE ~ country
49     )
50   ) %>%
51   inner_join(un_roll_calls, by = "rcid") %>%
52   inner_join(un_roll_call_issues, by = "rcid") %>%
53   filter(country %in% c("UK & NI", "US", "Turkey")) %>%
54   mutate(year = year(date)) %>%
55   group_by(country, year, issue) %>%
56   summarize(percent_yes = mean(vote == "yes")) %>%
57   ggplot(mapping = aes(x = year, y = percent_yes, color = country)) +
58   geom_point(alpha = 0.4) +
59   geom_smooth(method = "loess", se = FALSE) +
60   facet_wrap(~issue) +
61   scale_y_continuous(labels = percent) +
62   labs(
63     title = "Percentage of 'Yes' votes in the UN General Assembly",
64     subtitle = "1946 to 2015",
65     y = "% Yes",
66     x = "Year",
67     color = "Country"
68   ) +
69   theme_minimal()
70 ```
71
72
73 ## References {#references}
74
```

```
36 We can easily change which countries are being plotted by changing which
37 countries the code above `filter`'s for. Note that the country name should be
38 spelled and capitalized exactly the same way as it appears in the data. See
39 the [Appendix](#appendix) for a list of the countries in the data.
40
41 ```{r plot-yearly-yes-issue, fig.width=10, fig.height=6, message=FALSE}
42 un_votes %>%
43   mutate(
44     country =
45       case_when(
46         country == "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
47         country == "United States of America" ~ "US",
48         TRUE ~ country
49       )
50   ) %>%
51   inner_join(un_roll_calls, by = "rcid") %>%
52   inner_join(un_roll_call_issues, by = "rcid") %>%
53   filter(country %in% c("UK & NI", "US", "Turkey")) %>%
54   mutate(year = year(date)) %>%
55   group_by(country, year, issue) %>%
56   summarize(percent_yes = mean(vote == "yes")) %>%
57   ggplot(mapping = aes(x = year, y = percent_yes, color = country)) +
58   geom_point(alpha = 0.4) +
59   geom_smooth(method = "loess", se = FALSE) +
60   facet_wrap(~issue) +
61   scale_y_continuous(labels = percent) +
62   labs(
63     title = "Percentage of 'Yes' votes in the UN General Assembly",
64     subtitle = "1946 to 2015",
65     y = "% Yes",
66     x = "Year",
67     color = "Country"
68   ) +
69   theme_minimal()
70 ```
71
72
73 ## References {#references}
74
```

```
unvotes.Rmd x
Insert | Run | A

36 We can easily change which countries are being plotted by changing which
37 countries the code above `filter`'s for. Note that the country name should be
38 spelled and capitalized exactly the same way as it appears in the data. See
39 the [Appendix](#appendix) for a list of the countries in the data.
40
41 ```{r plot-yearly-yes-issue, fig.width=10, fig.height=6, message=FALSE}
42 un_votes %>%
43   mutate(
44     country =
45       case_when(
46         country == "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
47         country == "United States of America" ~ "US",
48         TRUE ~ country
49       )
50   ) %>%
51   inner_join(un_roll_calls, by = "rcid") %>%
52   inner_join(un_roll_call_issues, by = "rcid") %>%
53   filter(country %in% c("UK & NI", "US", "Turkey")) %>%
54   mutate(year = year(date)) %>%
55   group_by(country, year, issue) %>%
56   summarize(percent_yes = mean(vote == "yes")) %>%
57   ggplot(mapping = aes(x = year, y = percent_yes, color = country)) +
58   geom_point(alpha = 0.4) +
59   geom_smooth(method = "loess", se = FALSE) +
60   facet_wrap(~issue) +
61   scale_y_continuous(labels = percent) +
62   labs(
63     title = "Percentage of 'Yes' votes in the UN General Assembly",
64     subtitle = "1946 to 2015",
65     y = "% Yes",
66     x = "Year",
67     color = "Country"
68   ) +
69   theme_minimal()
70 ```
71
72
73 ## References {#references}
74
```

```
unvotes.Rmd x
Insert | Run | A

36 We can easily change which countries are being plotted by changing which
37 countries the code above `filter`'s for. Note that the country name should be
38 spelled and capitalized exactly the same way as it appears in the data. See
39 the [Appendix](#appendix) for a list of the countries in the data.
40
41 ```{r plot-yearly-yes-issue, fig.width=10, fig.height=6, message=FALSE}
42 un_votes %>%
43   mutate(
44     country =
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46         country == "United Kingdom of Great Britain and Northern Ireland" ~ "UK & NI",
47         country == "United States of America" ~ "US",
48         TRUE ~ country
49       )
50   ) %>%
51   inner_join(un_roll_calls, by = "rcid") %>%
52   inner_join(un_roll_call_issues, by = "rcid") %>%
53   filter(country %in% c("UK & NI", "US", "Turkey")) %>%
54   mutate(year = year(date)) %>%
55   group_by(country, year, issue) %>%
56   summarize(percent_yes = mean(vote == "yes")) %>%
57   ggplot(mapping = aes(x = year, y = percent_yes, color = country)) +
58   geom_point(alpha = 0.4) +
59   geom_smooth(method = "loess", se = FALSE) +
60   facet_wrap(~issue) +
61   scale_y_continuous(labels = percent) +
62   labs(
63     title = "Percentage of 'Yes' votes in the UN General Assembly",
64     subtitle = "1946 to 2015",
65     y = "% Yes",
66     x = "Year",
67     color = "Country"
68   ) +
69   theme_minimal()
70 ```
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73 ## References {#references}
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```

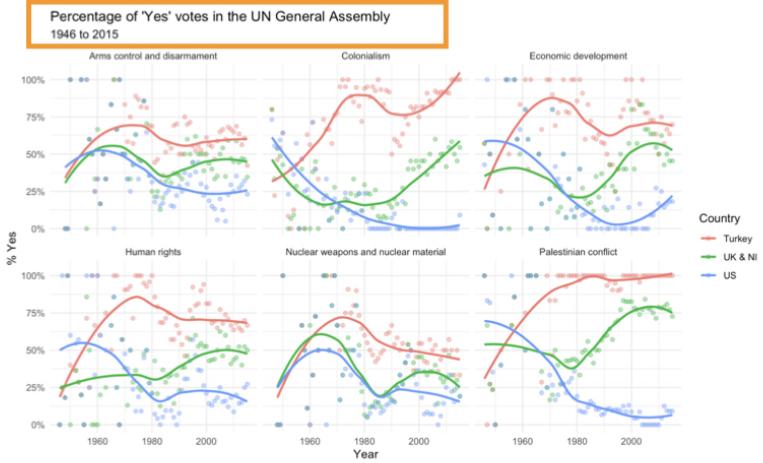
UN voting patterns

R Markdown

```

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```



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unvotes.Rmd

```

1 ---  

2 title: "UN Votes"  

3 author: "Mine Çetinkaya-Rundel"  

4 date: `r Sys.Date()`  

5 output:  

6   html_document:  

7     toc: yes  

8     toc_float: yes  

9 ---  

10  

11 ## Introduction  

12  

13 How do various countries vote in the United Nations General Assembly, how have  

14 their voting patterns evolved throughout time, and how similarly or differently  

15 do they view certain issues? Answering these questions (at a high level) is the  

16 focus of this analysis.  

17  

18 We will use the tidyverse, lubridate, and scales packages for the  

19 data wrangling and visualization, and the DT package for interactive display  

20 of tabular output. The data we're using come from the unvotes package.  

21  

22 ```{r load-packages, warning=FALSE, message=FALSE}  

23 library(tidyverse)  

24 library(lubridate)  

25 library(scales)  

26 library(DT)  

27 library(unvotes)  

28 ````  

29  

30 ## UN voting patterns {#voting}  

31  

32 Let's create a data visualization that displays how the voting record of the  

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42 un_votes %>%  

43   mutate(  

44     country =

```

Console

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UN voting patterns

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Appendix

UN Votes

Mine Çetinkaya-Rundel

2020-08-18

Introduction

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We will use the **tidyverse**, **lubridate**, and **scales** packages for the data wrangling and visualization, and the **DT** package for interactive display of tabular output. The data we're using come from the **unvotes** package.

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UN voting patterns

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```

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unvotes.Rmd

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```
2 title: "UN Votes"
3 author: "Mine Çetinkaya-Rundel"
4 date: `r Sys.Date()`
5 output:
6   html_document:
7     toc: yes
8     toc_float: yes
9 ---
10
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UN voting patterns

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Appendix

# UN Votes

Mine Çetinkaya-Rundel

2020-08-18

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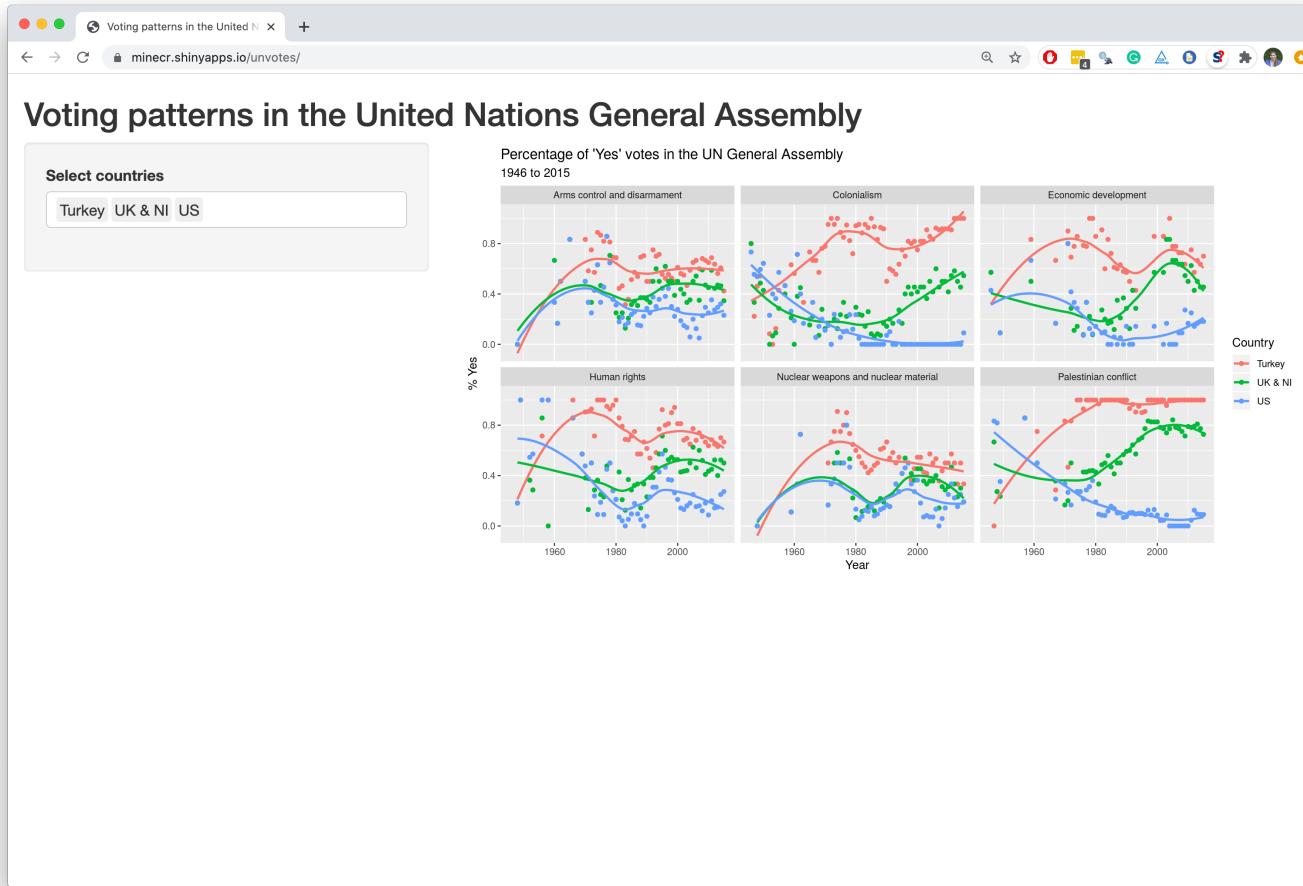
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# minecr.shinyapps.io/unvotes





## *Your turn:* AE 01 – UN Votes

- Go to [RStudio Cloud](#) and start the assignment AE 01 – UN Votes.
- Open and knit the R Markdown document `unvotes.Rmd`.