

Information Visualization

# Extending RAWGraphs

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# Agenda

- Rawgraphs 2.0
- Working Approach
- Paired Barchart
- Similarity Map
- Chord Diagram

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# Rawgraphs 2.0

- Open web tool
- Create static SVGs, choose from 31 different chart types
- Works with tabular data (spreadsheets, CSV)
- Developed in JavaScript on top of D3 library
- When used locally, no server side computation or storage (no one will touch your data but you)
- Allows the user to code custom charts and visualizations
- Developed by DensityDesign Research Lab (Politecnico di Milano), Calibro and INMAGIK

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# Working With Multiple Repositories

- rawgraphs-core
  - Only used to understand RAWGraphs data types
- rawgraphs-app
  - Imported the User Interfaces which were implemented in rawgraphs-charts
  - Additionally fixed a bug for enabling custom default color encoding
- rawgraphs-charts
  - All RAWGraphs compatible chart implementations were done here

# Adding Charts

Following is the file structure for adding charts to the rawgraphs-charts repository:

src

- └─ myChart : Chart name
  - ├─ dimensions.js : Settles the data dimensions which will also be shown later in the user interface
  - ├─ myChart.js : Used for exporting
  - ├─ index.js : Used for exporting
  - ├─ mapping.js : Used to prepare received data for the rendering process
  - ├─ metadata.js : Used to describe how the selection of the chart in the user interface should look like
  - ├─ render.js : Rendering logic of chart
  - └─ visualOptions.js : Options for the user to be able to customize chart to his needs

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# Paired Bar Chart - Dataset

- Austrian Population
- Original Dataset from Statistik Austria
- Modified (Binning) to fit Use Case of Paired Bar Chart

Age	Men	Women
0-4	224.777	212.537
5-9	218.830	205.708
10-14	216.616	205.934
...	...	...

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# Paired Bar Chart - Visual Options

- Adjustable Title
- Adjustable Axis Labels
- Adjustable Axis Ticks
- Adjustable Color Scaling with Defaults

AXIS

Left tick label rotation: 45

Align left tick labels to: Left

Right tick label rotation: 45

Align right tick labels to: Left

**Left label override**  
Men

Left label visible:  Yes

**Right label override**  
Women

Right label visible:  Yes

**Vertical label override**  
Age

Vertical label visible:  Yes

COLOR

Color scale: Sequential

Color scheme:

Start: 159  #FFF5F0

End: 357545  #67000D

Color scale: Sequential

Color scheme:

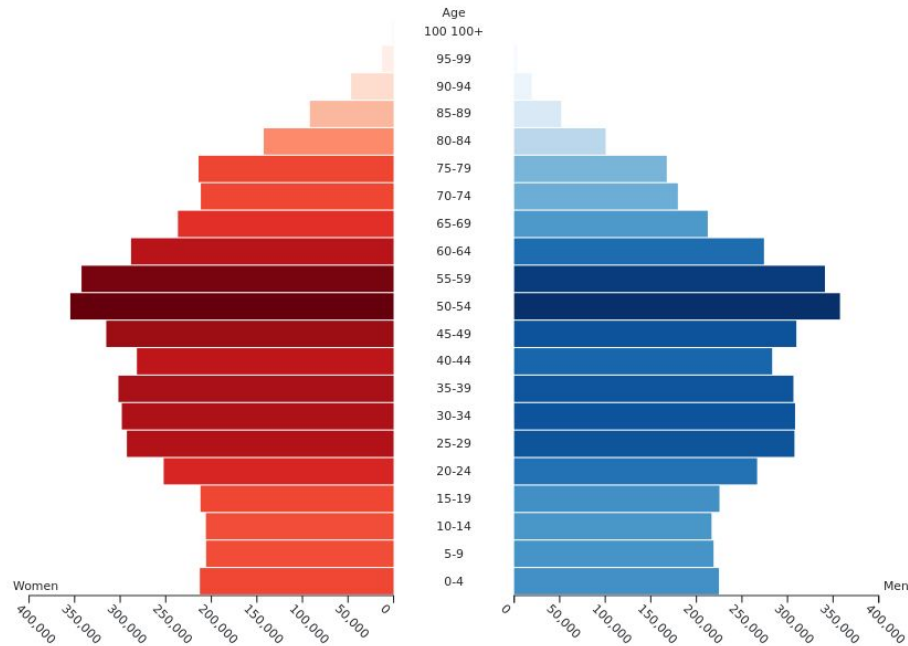
Start: 966  #F7FBFF

End: 354719  #08306B

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# Paired Barchart - Live Demo

End Result →



# Paired Bar Chart - Encountered Challenges

- Get used to both RAWGraphs and D3
- Spacing with Labeling And Axes
- Default Color Encoding: Bug In RAWGraphs App Implementation
- Left Side of Chart: Reverse Scaling with D3

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# Similarity Map - Library

libraries: tSNEjs [5] instead of DruidJS

# Similarity Map - Dataset

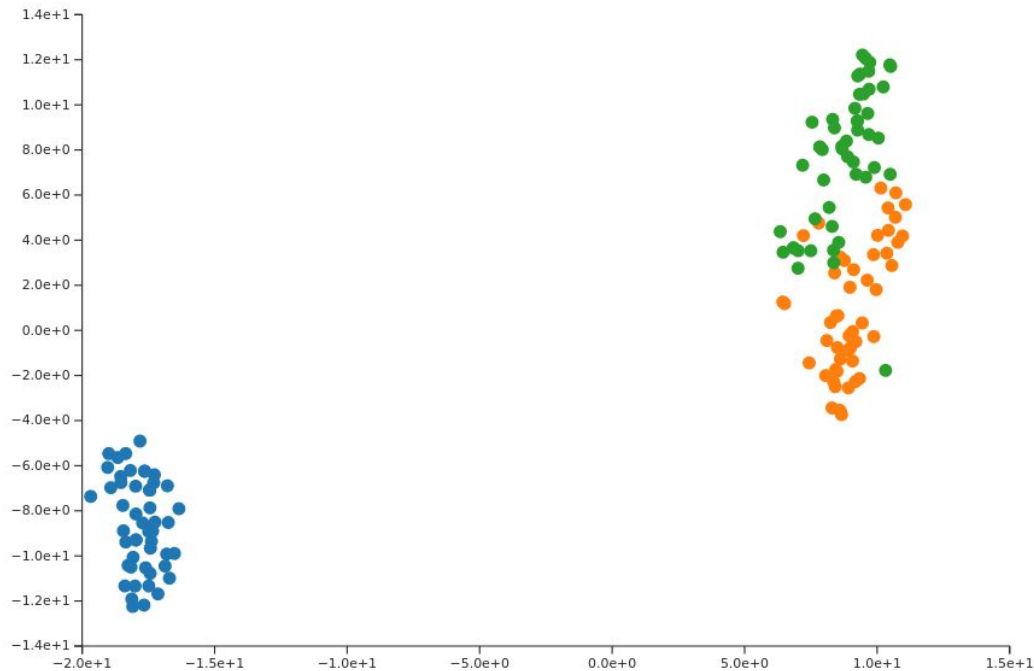
- Iris Dataset (famous database from Fisher, 1936)
- Dataset from UCI Machine Learning Repository
- 150 total entries, three classes, only one class is linearly separable

sepal length in cm	sepal width in cm	petal length in cm	petal width in cm	class
5.1	3.5	1.4	0.2	Iris-setosa
4.9	3.0	1.4	0.2	Iris-setosa
...	...	...	...	...

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# Similarity Map

- Learning Rate Epsilon = 10
- Nr. of Neighbors Influenced  
Perplexity = 30
- Dimensions = 2





# Similarity Map - Visual Options

- Chart Scaling Options
- T-SNE Parameters
- Dots Radius
- Color encoding

ARTBOARD —

Width (px)

Height (px)

Background  #FFFFFF

**Chart title**

Margin (top)

Margin (right)

Margin (bottom)

Margin (left)

T-SNE —

Epsilon

Perplexity

CHART —

Dots radius

COLOR —

Color scale Ordinal

Color scheme

Iris Setosa ■ #1F77B4

Iris Versicolor ■ #FF7F0E

Iris Virginica ■ #2CA02C

↺ ↻

# Similarity Map

## Live Demo

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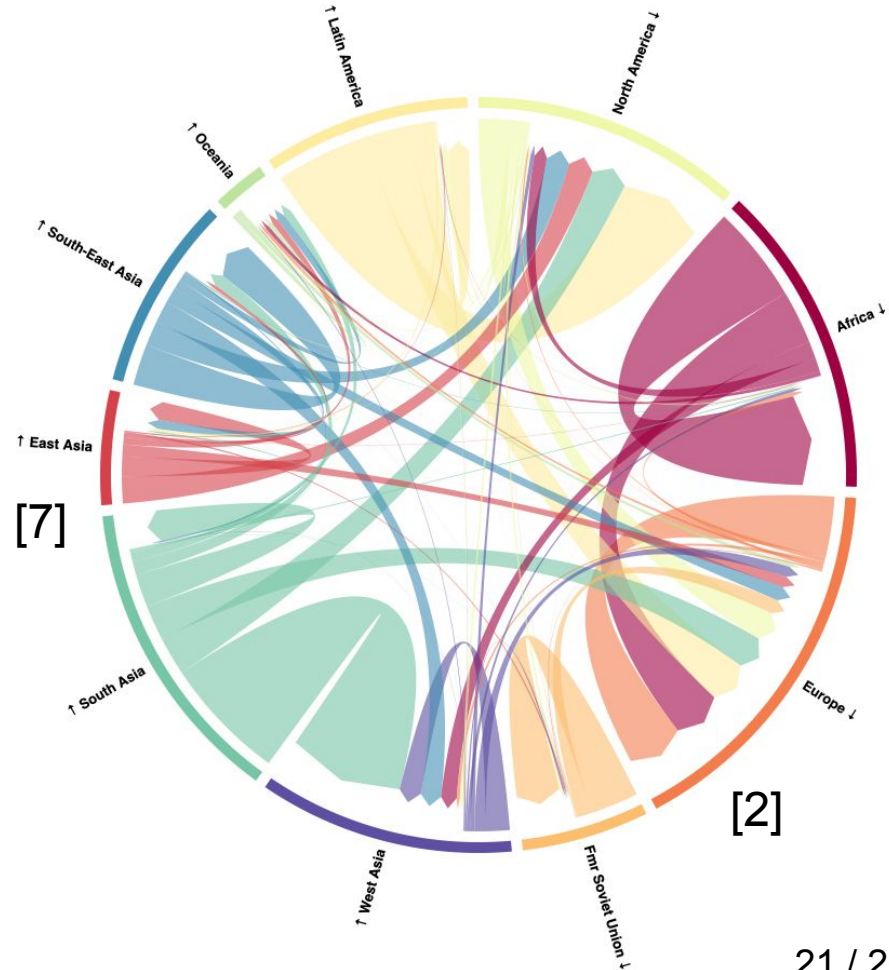
# Chord Diagram - Dataset

- *The Global Flow of People* by Sander, Abel & Bauer [2]
- Migration flows over 5 year periods between regions and countries of people changing their country of residence

	Aa Orig. Region ↓↑	Aa Dest. Region ↓↑	Aa Orig. Country ↓↑	Aa Orig. Country ... ↓↑	Aa Dest. Country ↓↑	Aa Dest. Country ... ↓↑	# Re
1	North America	North America	Canada	CAN	Canada	CAN	57617
2	North America	North America	Canada	CAN	United States	USA	57617
3	North America	North America	United States	USA	Canada	CAN	57617
4	North America	North America	United States	USA	United States	USA	57617

# Chord Diagram

- Chord diagram created in D3
  - Based on Mike Bostock [1] implementation  
Used under ISC License
- Porting to RAWGraps 2.0 based on  
the Implementation of the Arc Diagram [7]



# Chord Diagram - Visual Options

- Size
- Margin
- Ring
- Chord padding
- Chord color
- Chord opacity
- Labels (size, font)

ARTBOARD

Width (px) 805

Height (px) 600

Background  #FFFFFF

Margin (top) 50

Margin (right) 50

Margin (bottom) 50

Margin (left) 50

CHART

Ring width 10

Category padding 10

Chord padding (source) 10

Chord padding (target) 30

COLORS

Color scale Ordinal

Color scheme

Africa	#9E0142
East Asia	#D6424B
Europe	#F47D4D
Fmr Soviet Union	#FDBE70
Latin America	#FEEDA1
North America	#F0F8A9
Oceania	#BEE5A0
South Asia	#77C6A7
South-East Asia	#438FB4
West Asia	#5E4FA2

Chord opacity 0,7

LABELS

Show Chord Group Labels  Yes

Font size 12

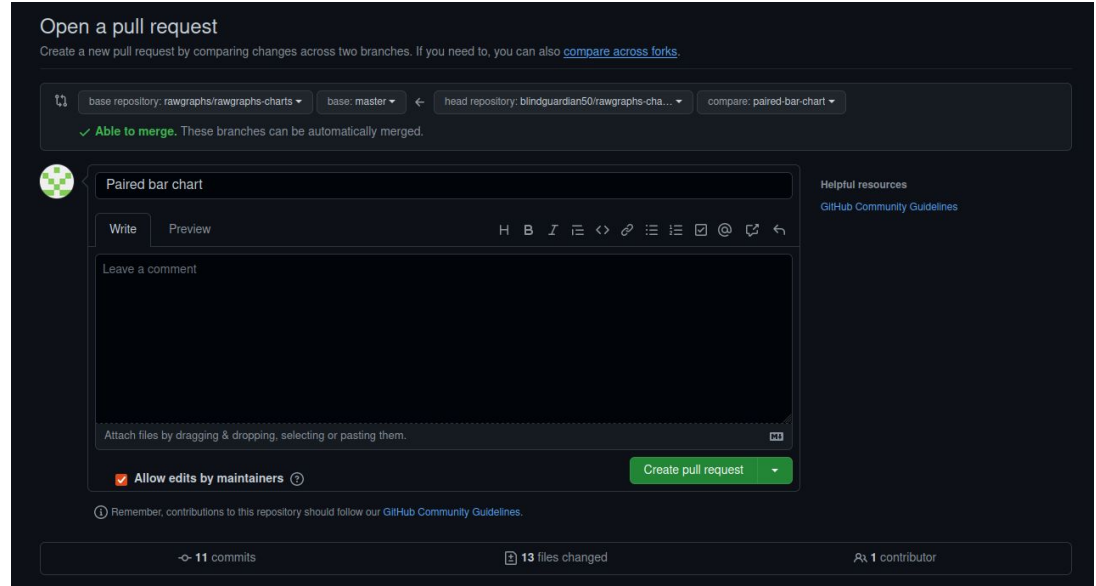
Font family Sans-serif

# Chord Diagram

## Live Demo

# Next Steps

- Open Pull requests
- See if chart implementations will be included
- Stay in contact with RAWGraphs Team



The screenshot shows the GitHub 'Open a pull request' page. At the top, it says 'Open a pull request' and provides a link to 'compare across forks'. Below this, there are dropdown menus for the base repository ('rawgraphs/rawgraphs-charts'), base branch ('master'), head repository ('blindguardian50/rawgraphs-cha...'), and compare branch ('paired-bar-chart'). A green checkmark indicates 'Able to merge. These branches can be automatically merged.' The main content area has a title 'Paired bar chart' and a rich text editor with 'Write' and 'Preview' tabs. The editor contains the text 'Leave a comment' and a placeholder for attaching files. At the bottom right of the editor is a green 'Create pull request' button. Below the editor, there is a checkbox for 'Allow edits by maintainers' which is checked. At the very bottom, there is a footer with '11 commits', '13 files changed', and '1 contributor'.



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# References

[1] <https://observablehq.com/@d3/chord-diagram#chart>

[2] Guy J. Abel and Nikola Sander (2014). Quantifying Global International Migration Flows. *Science*, 343 (6178).

<http://global-migration.info>

[3] <https://www.statistik.at/statistiken/bevoelkerung-und-soziales/bevoelkerung/bev>

[oelkerungsstand/bevoelkerung-nach-alter/geschlecht](https://www.statistik.at/statistiken/bevoelkerung-und-soziales/bevoelkerung/bevoelkerungsstand/bevoelkerung-nach-alter/geschlecht)

[4] <https://archive.ics.uci.edu/ml/datasets/iris>

[5] <https://github.com/karpathy/tsnejs>

[6] <https://rawgraphs.io/>

[7] <https://github.com/rawgraphs/rawgraphs-charts/tree/master/src/arcDiagram>