

Information Visualization

Open-Source Chart Editors

David Egger

Elias Doppelreiter

Ludwig Reinhardt

Stefan Schnutt

Introduction

Open-Source

Software with source code that anyone can inspect, modify, and enhance

Chart Editor

Tools to generate visual representations of data (i.e., charts)

Editor Types

Visual, Interactive Chart Editors

Grammar-based Chart Editors

Datasets

Bar Charts

Graz Election Results 2021¹

Party	Percent
KPÖ	28.8
ÖVP	25.9
GRÜNE	17.3
FPÖ	10.6
SPÖ	9.5
NEOS	5.4
BASIS	0.9

Line Charts

Student Enrollment at Graz
University of Technology²

Year	Students
2015	13 167
2016	13 454
2017	13 737
2018	13 373
2019	13 566
2020	13 673
2021	13 712

Scatter Plots

CO2 Emissions and Population by Country³

Country	Total CO2 in Mt	Population in Mio.
China	11 680.42	1 402.00
United States	4 535.30	329.50
India	2 411.73	1 380.00
Russia	1 674.23	144.10
Japan	1 061.77	125.80
Iran	690.24	83.99
Germany	636.88	83.24
South Korea	621.47	51.78
Saudi Arabia	588.81	34.81
Indonesia	568.27	273.50

[1] <https://wahlergebnis.graz.at/>

[2] https://online.tugraz.at/tug_online/studierendenstatistik.html

[3] <https://data.worldbank.org/>, <https://publications.jrc.ec.europa.eu/repository/handle/JRC123071>

Chart Editors

RAWGraphs

Vega Editor

Voyager

Dex

Liquid Diagrams

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RAWGraphs 2.0 Beta

Developed by DensityDesign Research Lab
(Politecnico di Milano), Calibro and INMAGIK¹

Built in JavaScript on top D3 library and React

Works with tabular data

Spreadsheets, CSV

No server communication when used locally

Personal data can be kept private

Allows users to code custom charts and visualizations

Create static SVGs from 31 different chart types

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

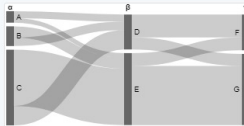
RAWGraphs Demo

RAWGraphs 2.0 beta

[About](#) [Learning](#) [GitHub](#)

[Report Issue](#)

2. Choose a chart



Alluvial Diagram


It shows correlations between categorical dimensions representing them as flows, visually linking categories with shared items. Each rectangle represents a unique value in the selected dimension, its height is proportional to its value. Correlations are represented with curved lines whose width is proportional to their value.


[Code](#) [Tutorial](#)


Show All charts ▾


 **Alluvial Diagram**
Correlations, proportions

 **Arc Diagram**
Networks


 **Bar chart**
Correlations


 **Multi-set bar chart**
Correlations, proportions


 **Stacked bar chart**
Correlations, proportions

 **Beeswarm plot**
Distributions, time series, proportions

 **Box plot**
Distributions


 **Bubble chart**
Correlations, proportions


 **Bumpchart**
Time series, correlations, proportions


 **Calendar heatmap**
Time chunks, proportions

 **Circle Packing**
Hierarchies, proportions


 **Circular dendrogram**
Hierarchies, proportions

 **Contour plot**
Correlations, distributions


 **Convex hull**
Correlations, proportions


 **Linear dendrogram**
Hierarchies, proportions


 **Gantt chart**
Time series, correlations


 **Hexagonal binning**
Correlations, distributions


 **Horizon graph**
Time series, correlations


 **Line chart**
Time series, correlations

 **Matrix Plot**
Correlations, time series, proportions

 **Parallel coordinates**
Correlations, distributions

 **Pie chart**
Proportions

 **Radar Chart**
Correlations

 **Sankey Diagram**
Networks

<https://youtu.be/4mK3vy45L-l>

RAWGraphs Bar Chart

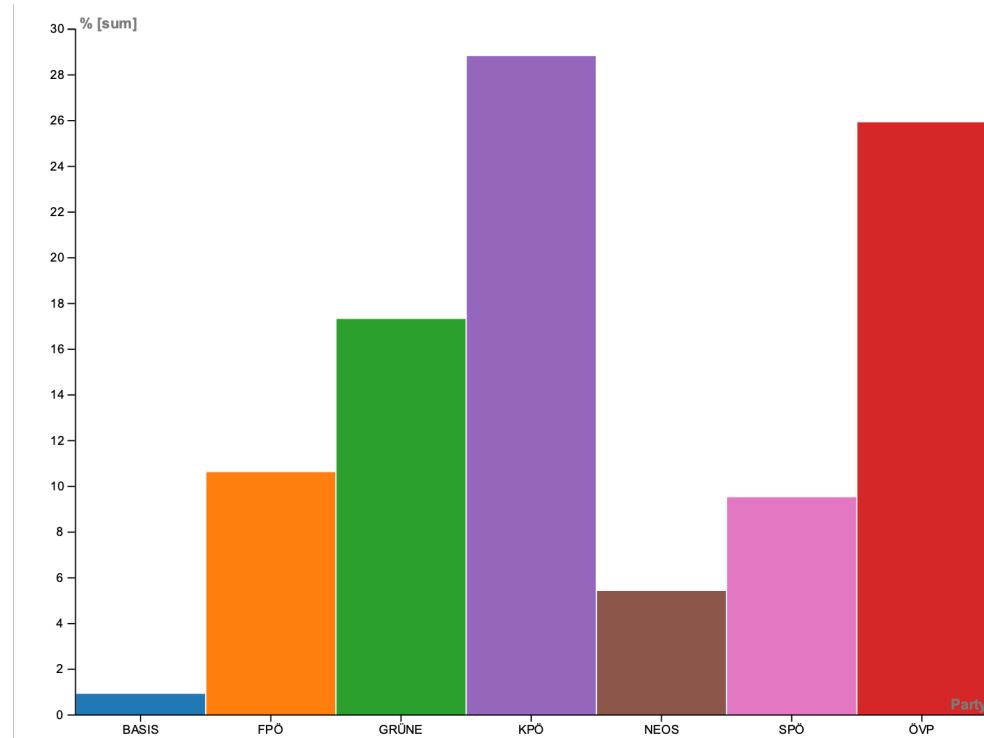
Chart variables:

Bars

Size

Color

Series



RAWGraphs Line Chart

Chart variables:

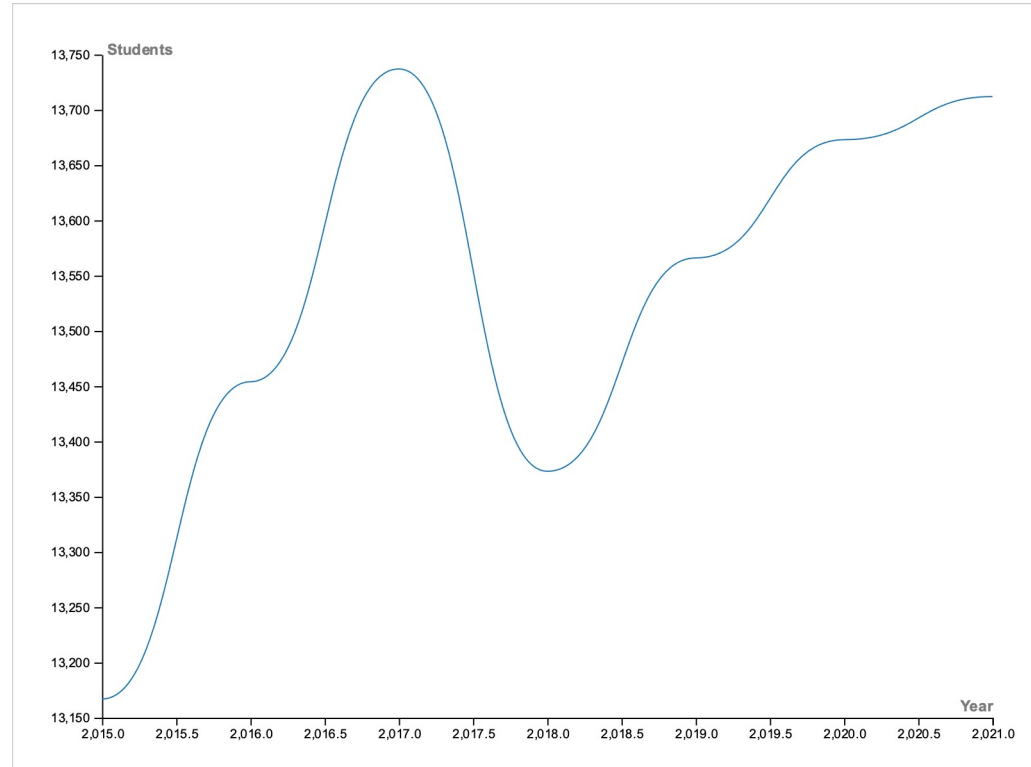
X Axis

Y Axis

Lines

Color

Series



RAWGraphs Scatter Plot (Bubble Chart)

Chart variables:

X Axis

Y Axis

Size

Color

Connection By

Label

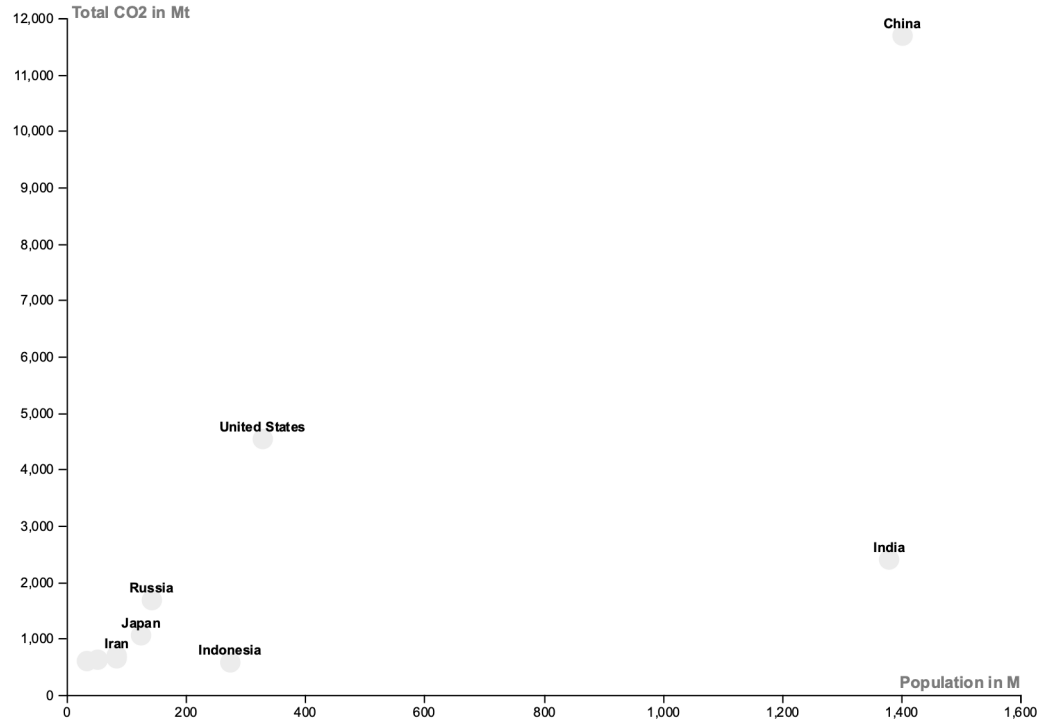


Chart Editors

RAWGraphs

Vega Editor

Voyager

Dex

Liquid Diagrams

Vega Editor

Developed by University of Washington Interactive Data Lab¹

Built in JavaScript on top of D3 library and React

Compiles Vega specification

Authors call it “visualization grammar”

JSON file describes visual appearance

Editor renders SVG/Canvas

Local execution possible

Imported CSV files are kept private

[1] <https://vega.github.io/vega/>

Vega Editor Demo

<https://youtu.be/9PBzu9acj4I>

Vega-Lite | Run Auto | Commands | Export | Share | Gist | Examples

VEGA-LITE | CONFIG

```
1 {
2   "data":
3     {
4       "name": "source",
5       "format": {"type": "csv"},
6       "url": "data/students-tugraz.csv"
7     },
8   "mark": "line",
9   "encoding": {
10    "y": {
11      "field": "Students",
12      "type": "quantitative"
13    },
14    "x": {
15      "field": "Year",
16      "type": "quantitative"
17    }
18  },
19  "config": {
20    "line": {
21      "point": true
22    },
23    "scale": {
24      "useUnaggregatedDomain": true
25    }
26  }
27 }
```

Year	Students
2015	13,000
2016	13,500
2017	13,800
2018	13,500
2019	13,800
2020	13,800
2021	13,800

Working Locally with Vega Editor

1st Approach

Running Vega Editor locally

Clone Online Editor source code
using yarn package manager

Data can be put in public folder
is then accessible from editor

Otherwise identical to online version

2nd Approach

Using Vega Desktop

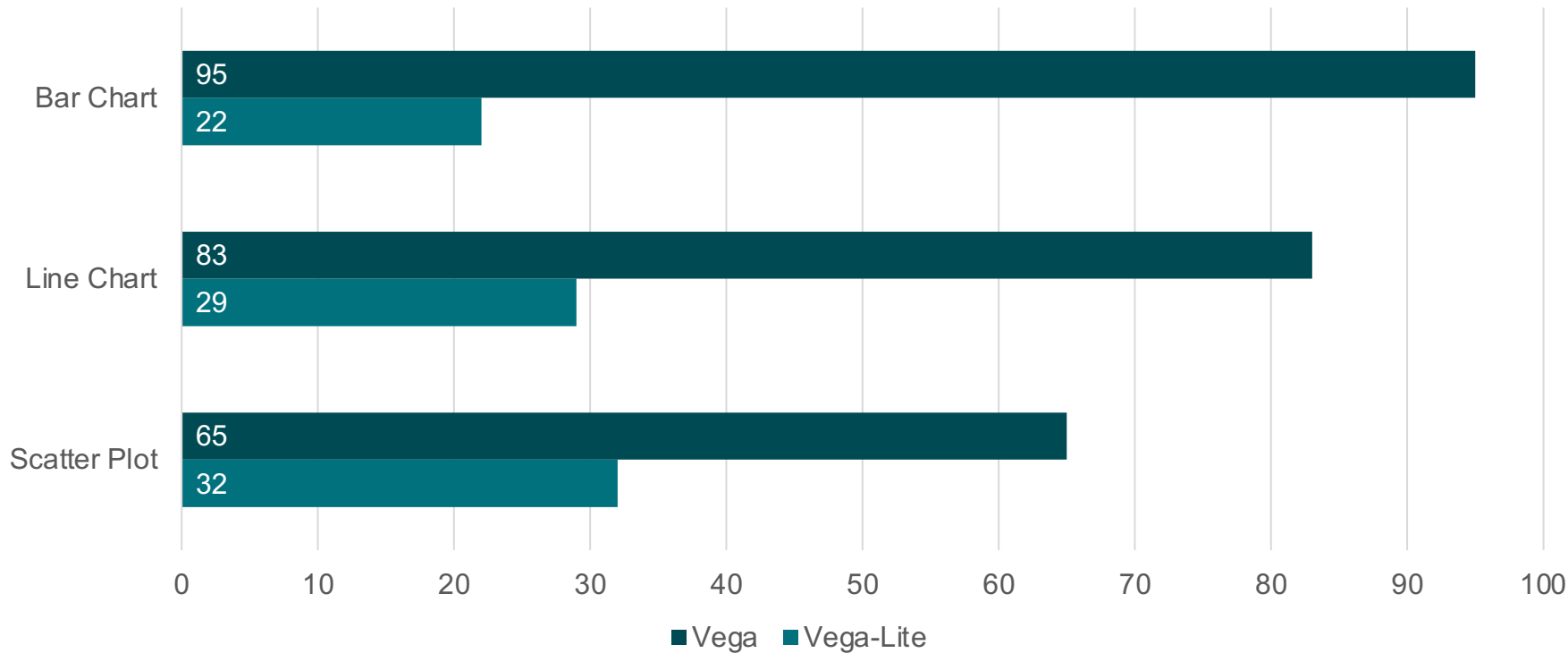
Watch mode

Personal working approach was
VSCode + Vega Desktop

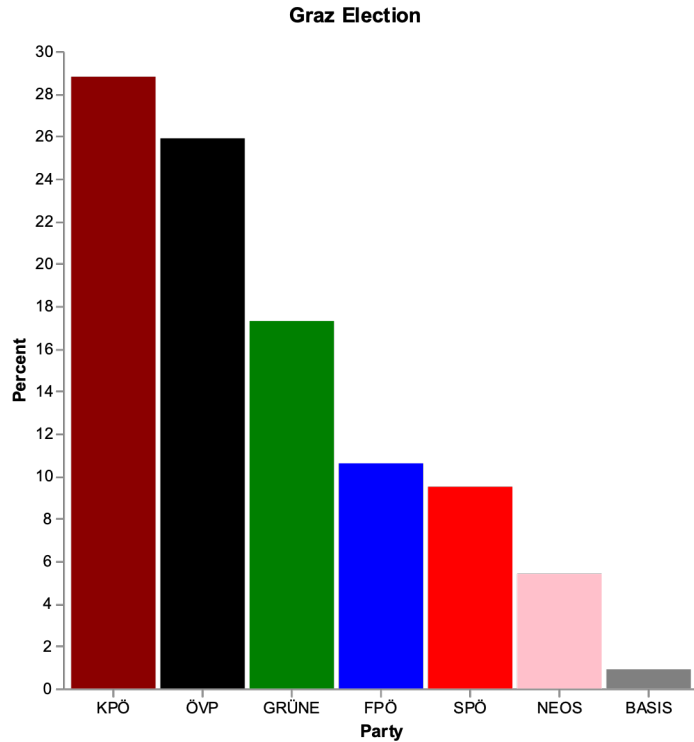
Disadvantage: has some trouble
compiling some specifications from
Vega-Lite

Vega Specifications

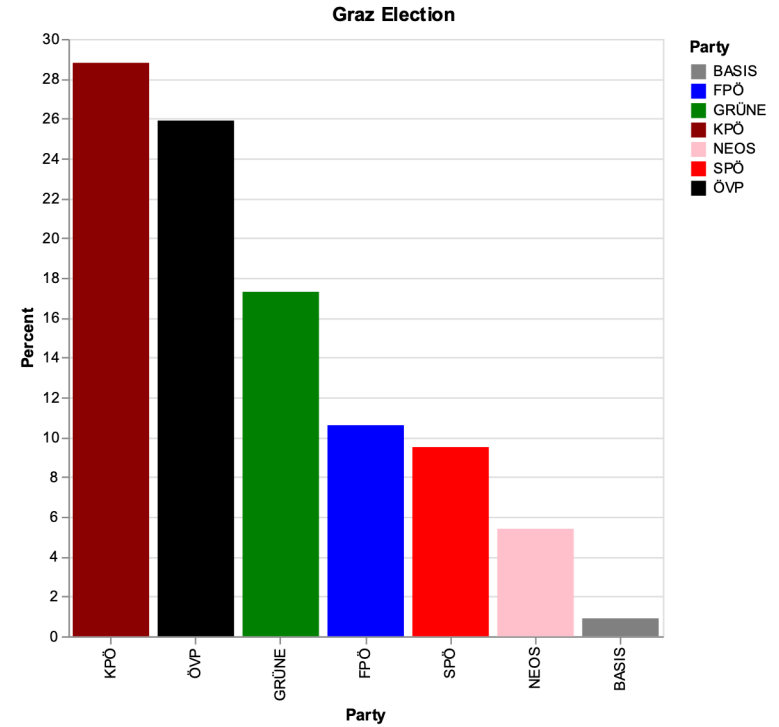
Lines of Code for Chart Types Between Vega Specifications



Vega Bar Charts

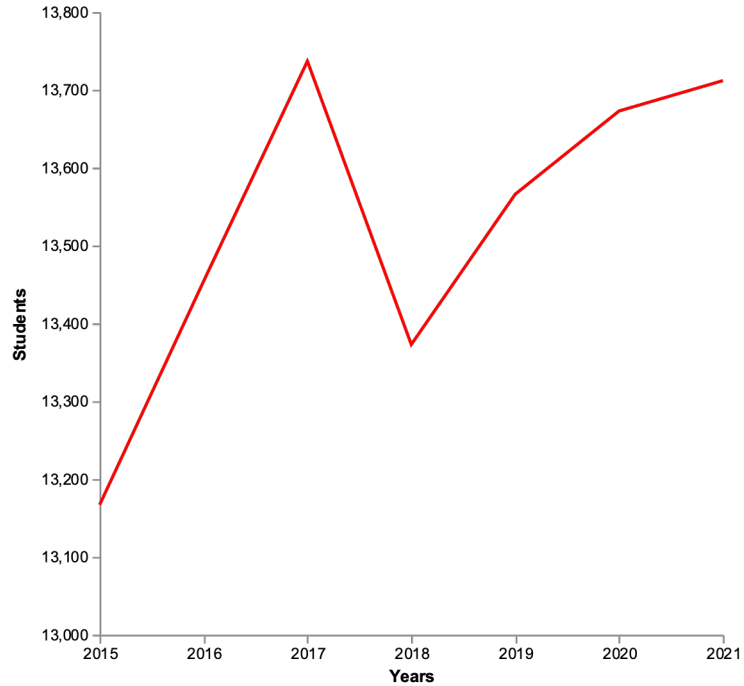


Vega

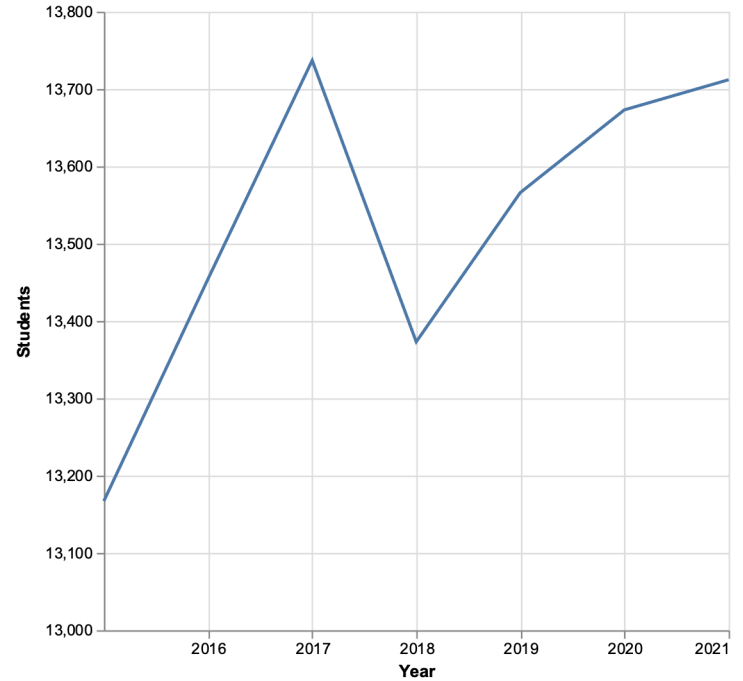


Vega-Lite

Vega Line Charts

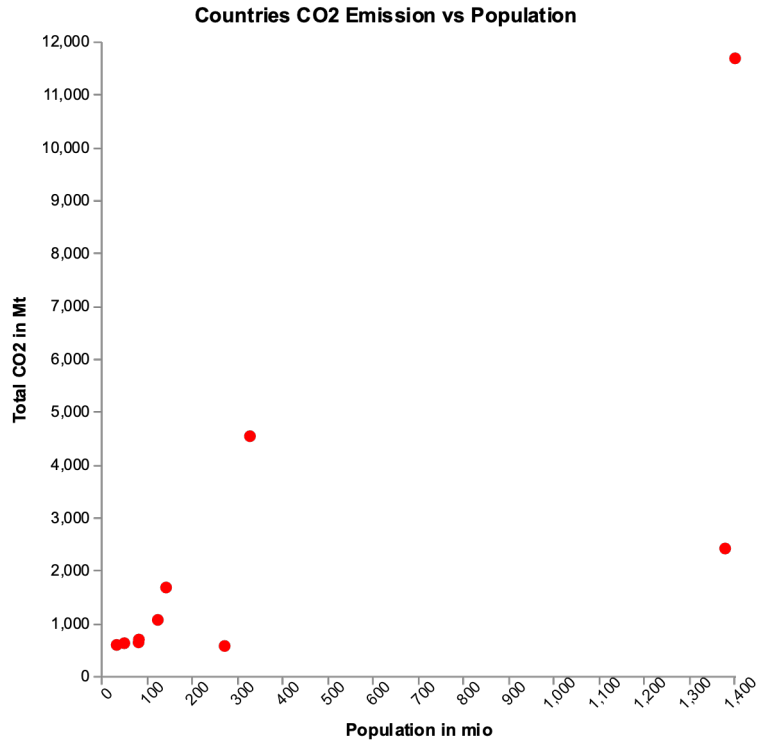


Vega

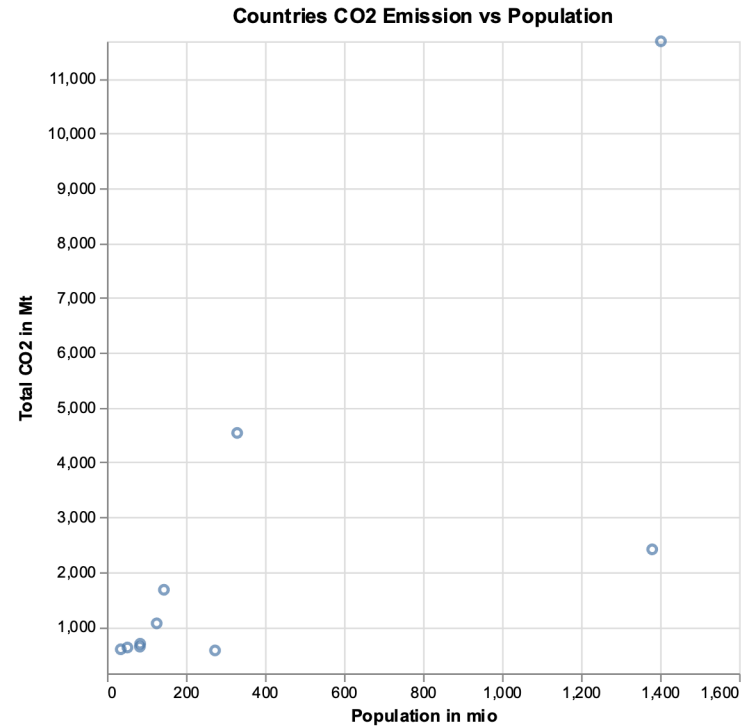


Vega-Lite

Vega Scatter Plots



Vega



Vega-Lite

Chart Editors

RAWGraphs

Vega Editor

Voyager

Dex

Liquid Diagrams

Voyager

Developed by University of Washington Interactive Data Lab¹

Two Versions

Older version written in AngularJS

could not be run locally

Newer alpha migration to React

could be built and run locally

Visual tool for data exploration

Lots of diagrams immediately visible

With a little effort allows to explore correlations quickly

[1] <https://github.com/vega/voyager>

Voyager Demo

<https://youtu.be/-5Pijz9V-pQ>

datavoyager Bookmarks (0) Undo Redo

Data
students-tugraz Change

Fields

- # Students
- # Year
- # COUNT

Wildcard Fields

- # Quantitative Fields

Encoding Clear

x # Year

y # Students

Mark line

size Drop a field here

color Drop a field here

shape Drop a field here

detail Drop a field here

text Drop a field here

Facet

row Drop a field here

column Drop a field here

Wildcard Shelves

any Drop a field here

Filter

Drop a field here

Specified View

Year	Students
2015	13,500
2016	13,800
2017	14,000
2018	13,800
2019	13,800
2020	13,800
2021	13,800

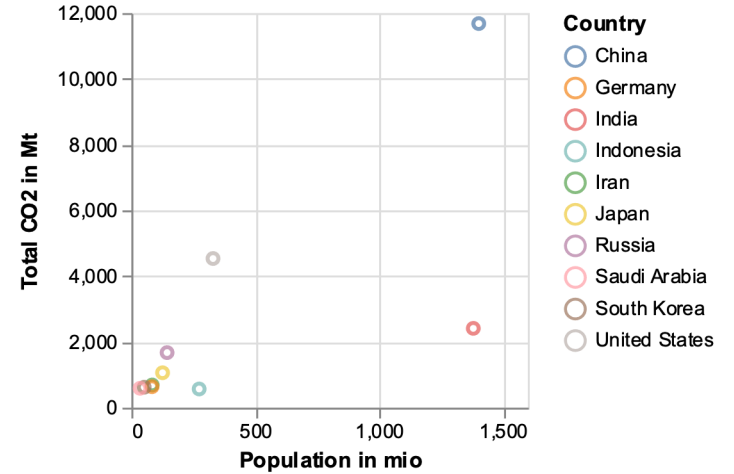
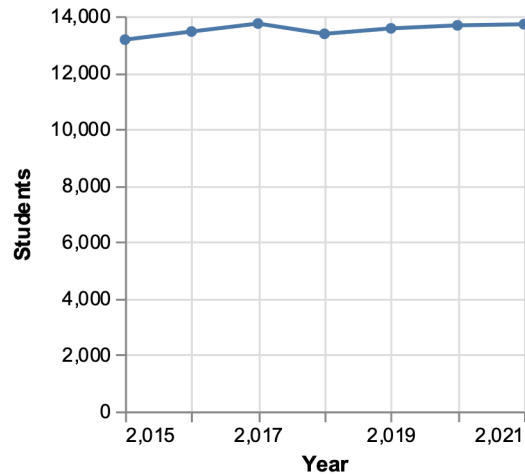
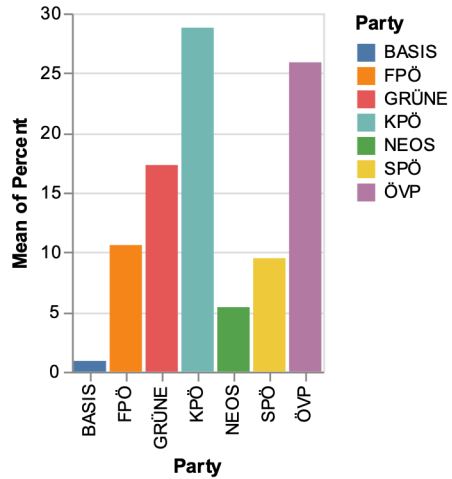
Related Views

Related Summaries

- # MEAN (Students)
- # MEAN (Year)

Mean of Year	Mean of Students
2,017	14,000

Voyager Charts



Voyager Import/Export

Import

CSV file upload

CSV / JSON / TSV from URL

No preview

Export

In normal mode only Vega-Lite export possible

In debug mode the Vega specification can be copied

Chart Editors

RAWGraphs

Vega Editor

Voyager

Dex

Liquid Diagrams

Dex - The Data Explorer

Developed by Patrick Martin¹

Apache-2.0 License

Written in Java 8.0 and Groovy using JavaFX

Visualization through different libraries

- JavaFX

- Google

- Plotly

- D3

- C3

- ...

[1] <http://dexvis.net/> and <https://github.com/PatMartin/Dex>

Dex Import/Export

Import

Text File

CSV

Text Input

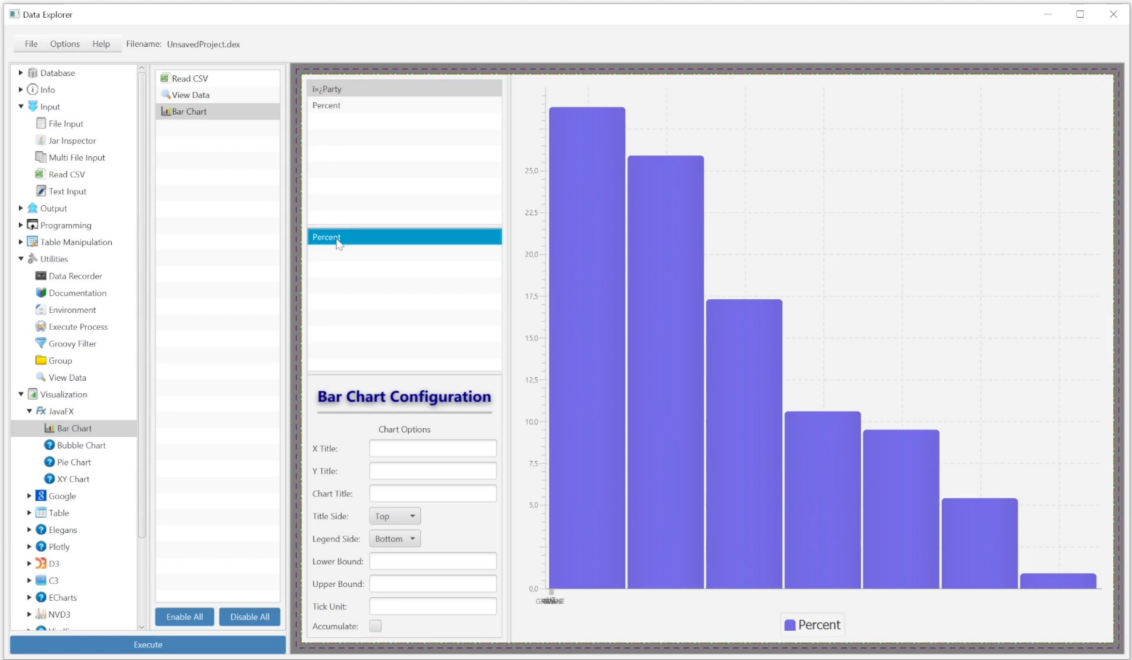
Export

Save project

Groovy Template

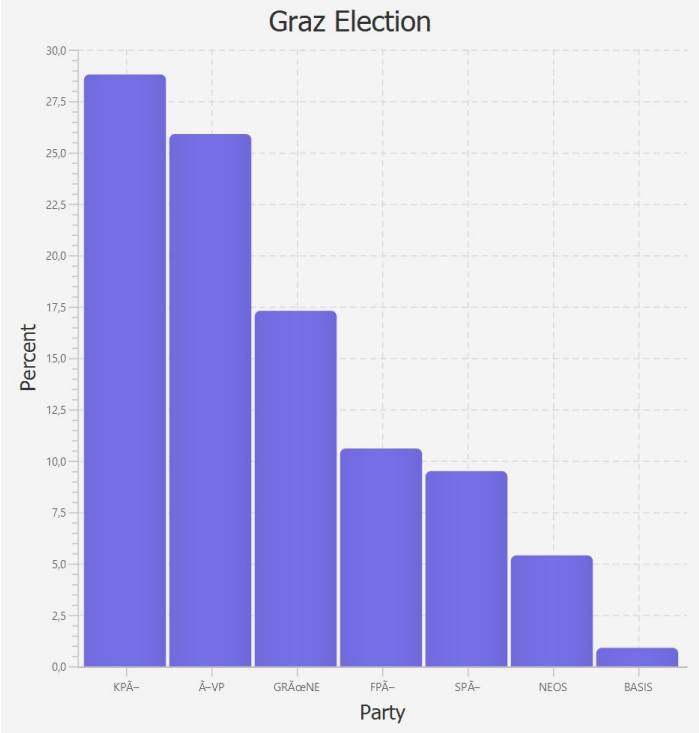
HTML through Templates

Dex Demo

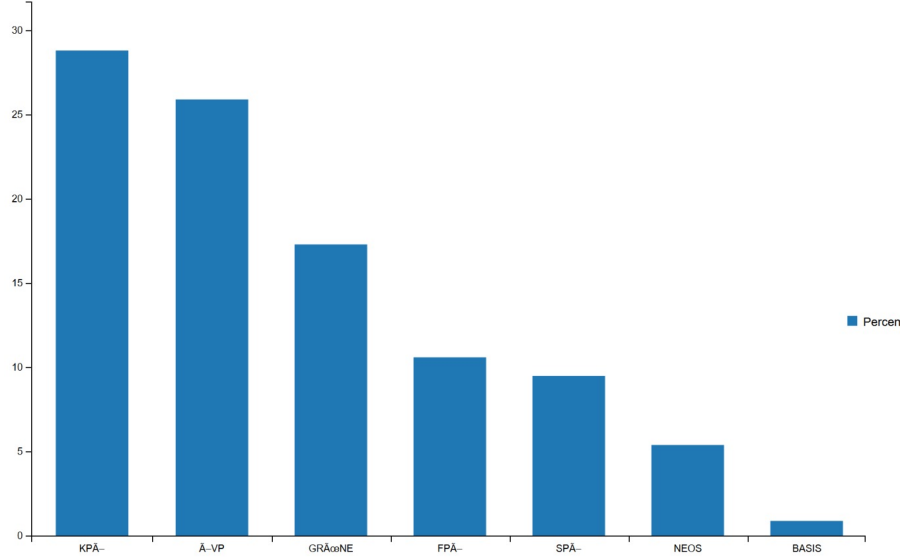


https://youtu.be/tu_hpRqh4Tk

Dex Bar Charts

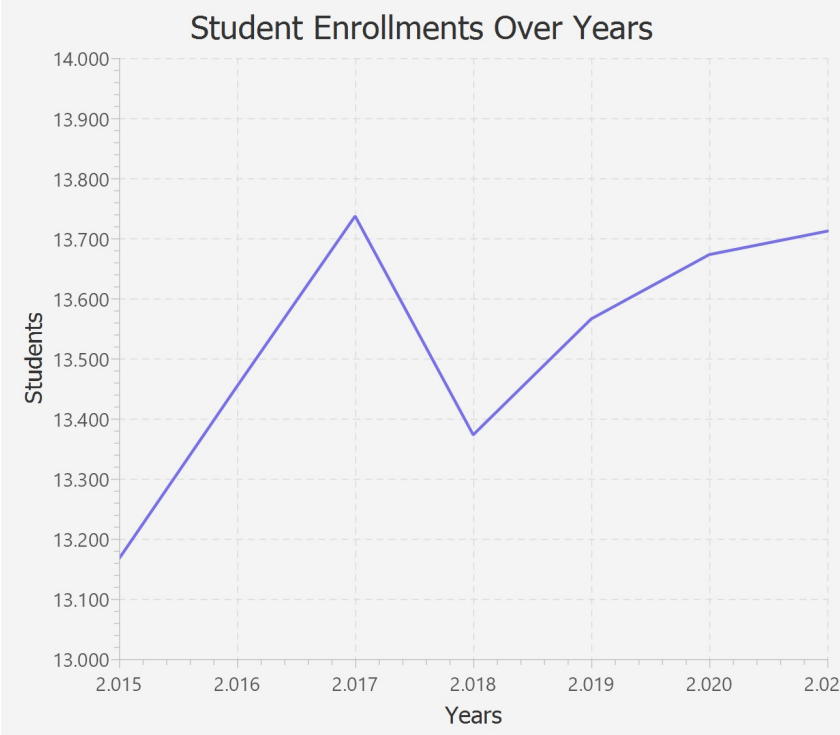


JavaFX

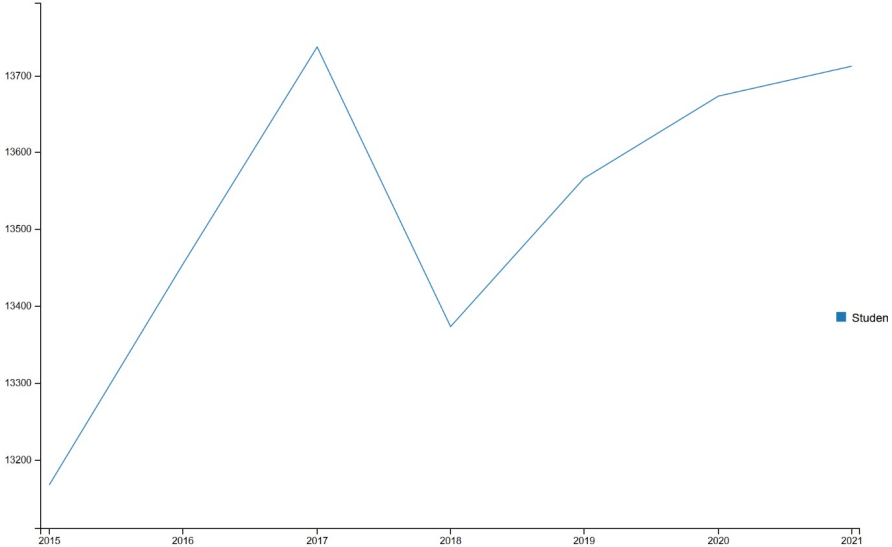


C3

Dex Line Charts

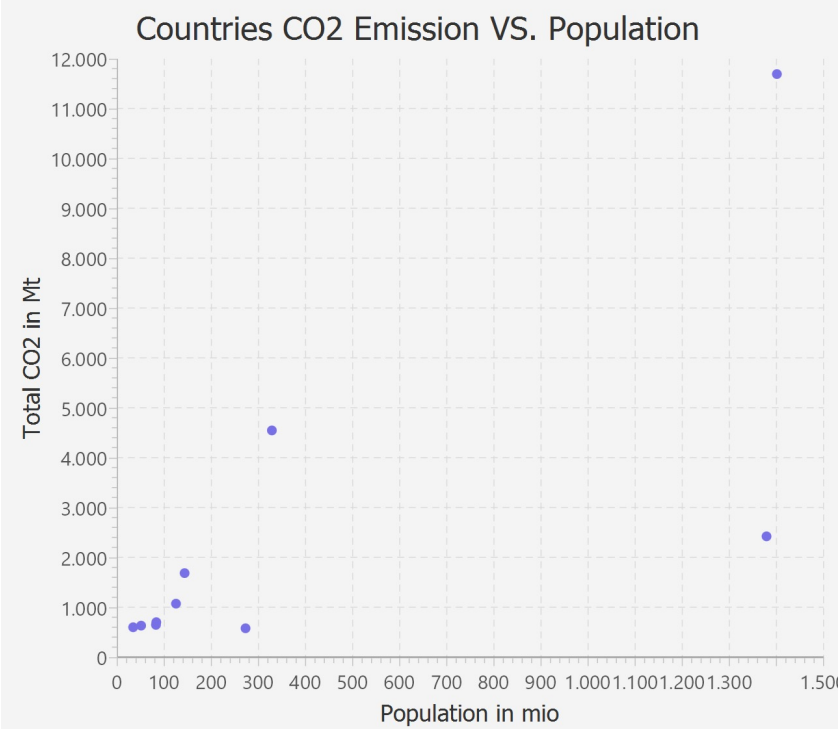


JavaFX

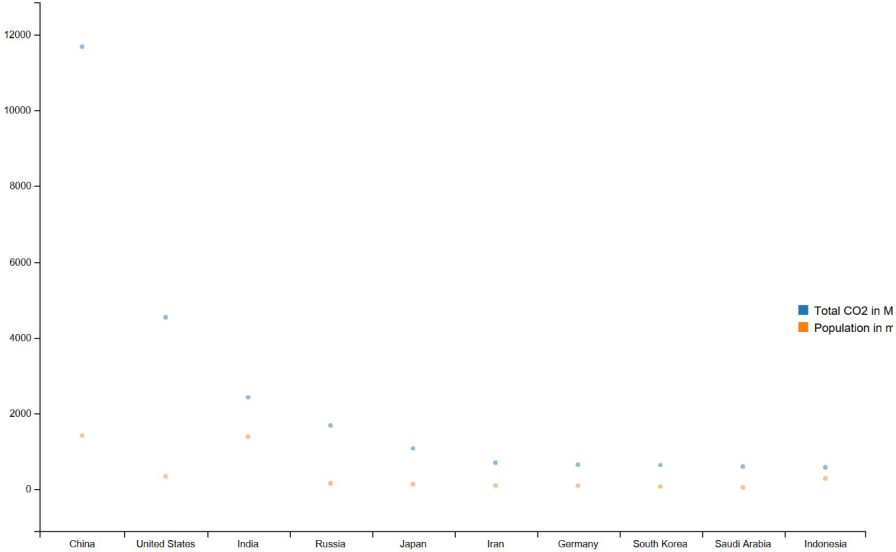


C3

Dex Scatter Plots



JavaFX



C3

Chart Editors

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Liquid Diagrams

Liquid Diagrams

Developed at Graz

University of Technology

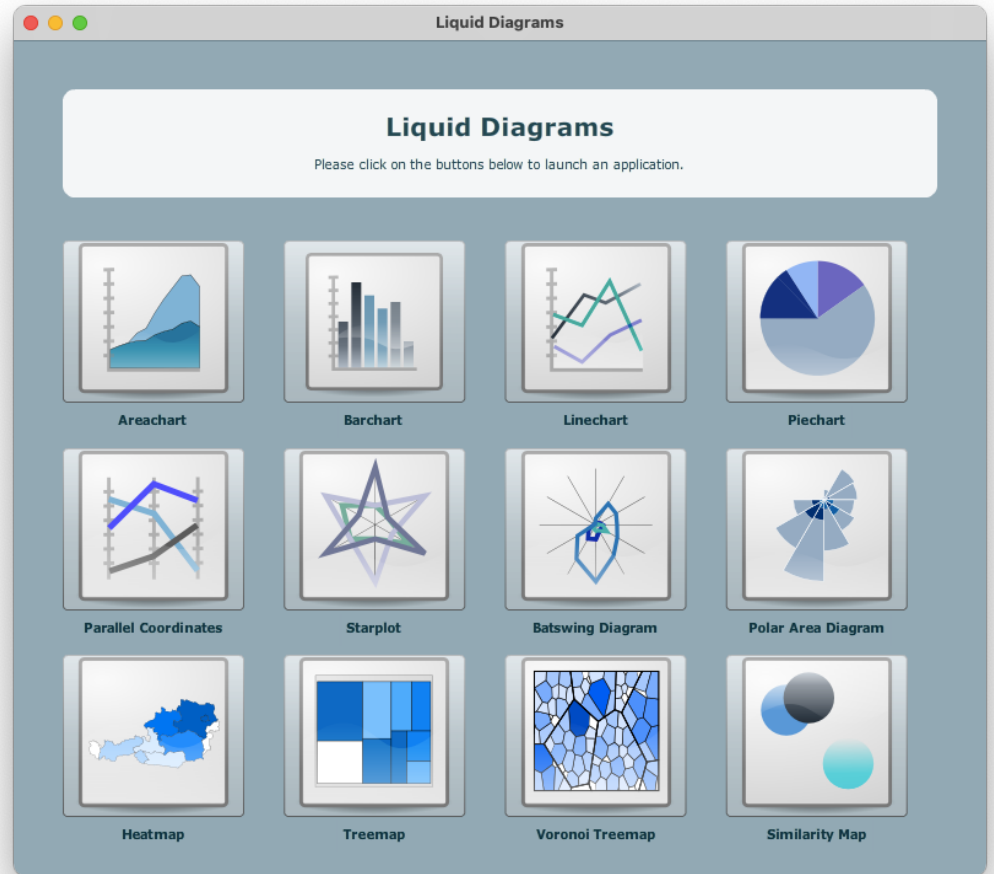
Institute for Information Systems
and Computer Media (IICM)

Built using Adobe Flash

No longer supported

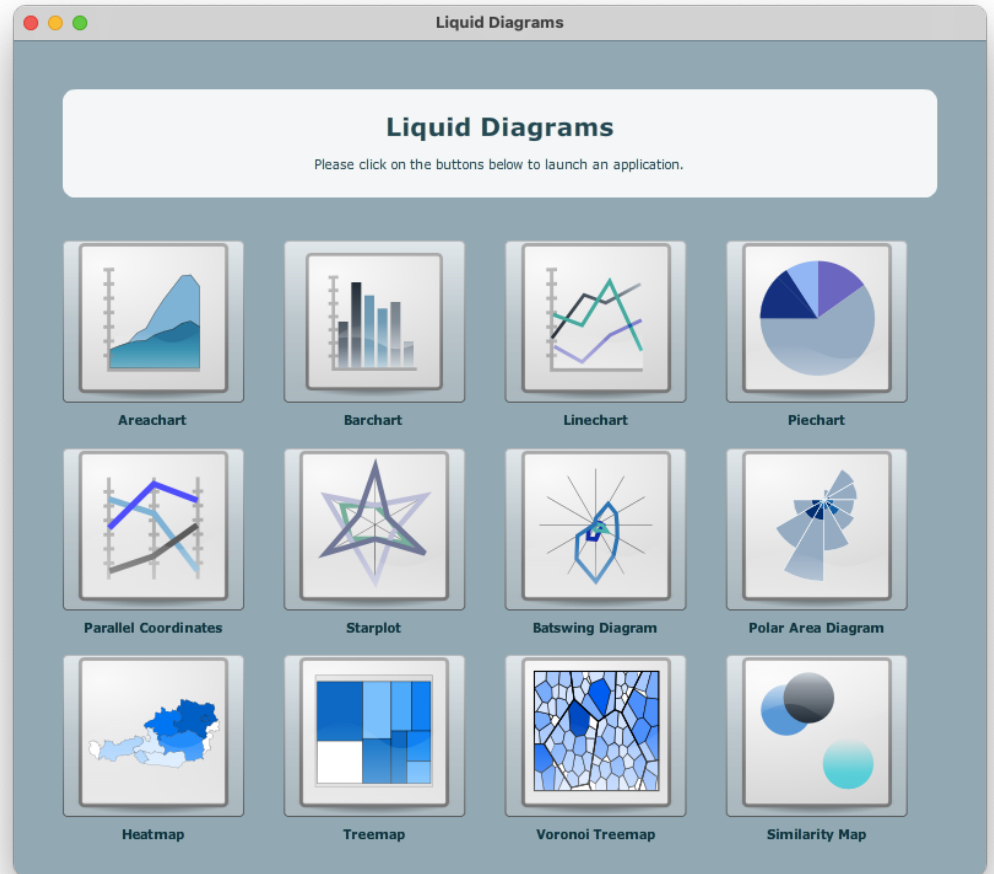
Still executable on AIR

Adobe Integrated Runtime

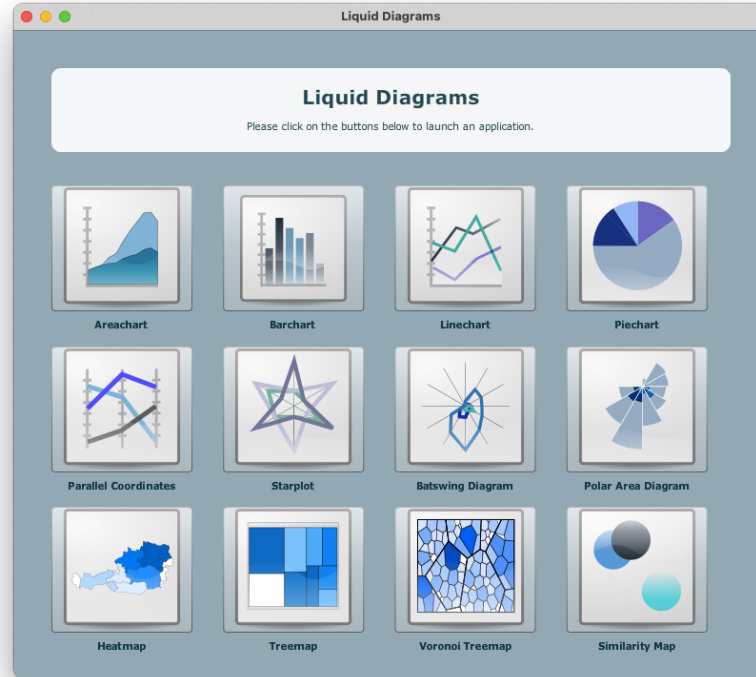


Liquid Diagrams

- ✓ Bar Charts
- ✓ Line Charts
- ✗ Scatter Plots

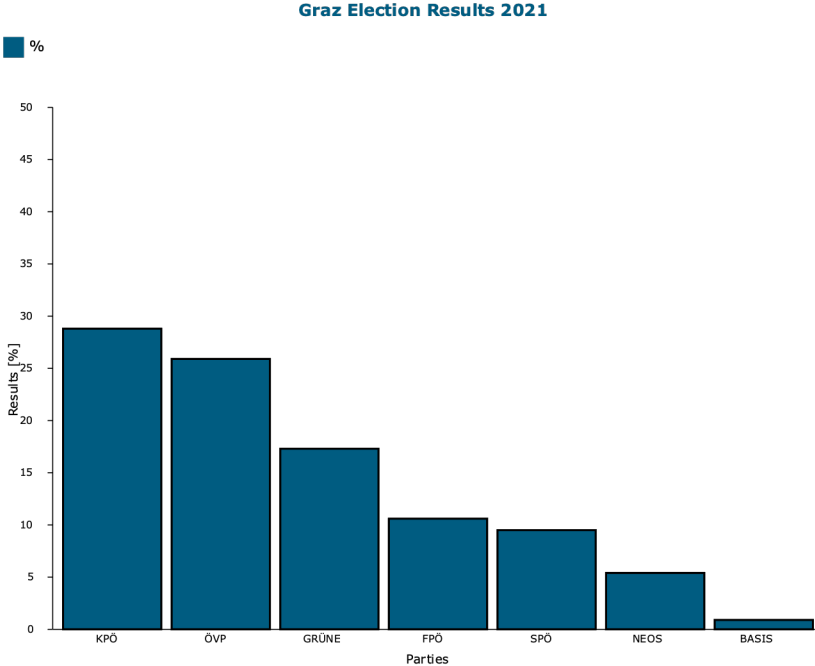


Liquid Diagrams Demo

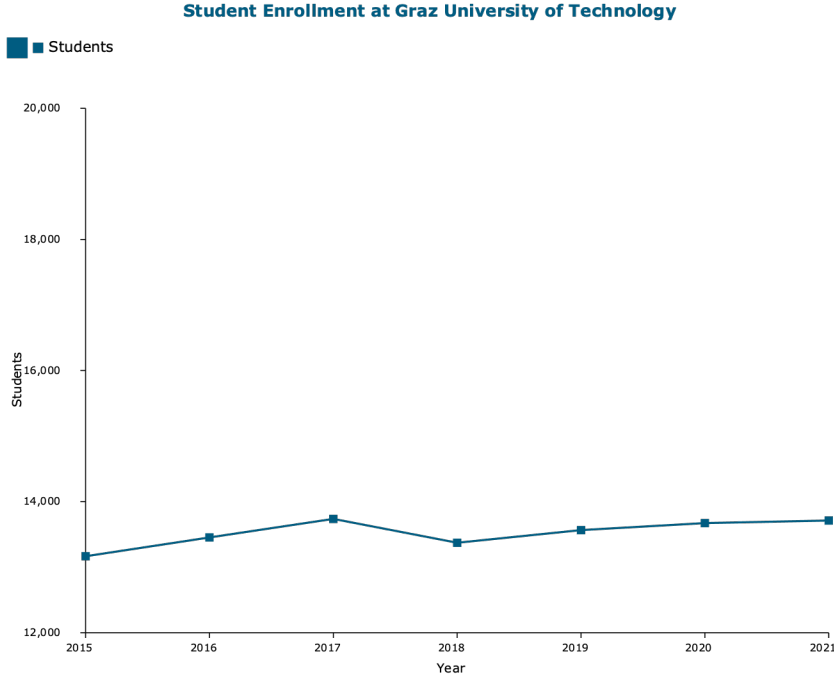


https://youtu.be/dC6e_gV78rA

Liquid Diagrams Charts



Bar Chart



Line Chart

Chart Editors

RAWGraphs

Vega Editor

Voyager

Dex

Liquid Diagrams

Comparison of Chart Editors (1/3)

	RAWGraphs	Vega Editor	Voyager	Dex	Liquid Diagrams
Chart Editor Type					
Grammar-based	~	✓	X	X	X
Visual/Interactive	✓	X	✓	✓	✓
Local Installation					
Binary Installable				✓	✓
Source Compilable	✓	✓	✓	✓	No longer supported
Chart Types					
Bar Chart	✓	✓	✓	✓	✓
Line Chart	✓	✓	✓	✓	✓
Scatter Plot	✓	✓	✓	✓	X

Comparison of Chart Editors (2/3)

	RAWGraphs	Vega Editor	Voyager	Dex	Liquid Diagrams
Input Formats					
CSV	✓	✓	✓	✓	✓
Proprietary File Format	✓	✓	X	✓	X
Export Formats					
PNG	✓	✓	X	X	✓
SVG	✓	✓	X	X	✓
Proprietary File Format	✓	✓	✓	✓	X

Comparison of Chart Editors (3/3)

	RAWGraphs	Vega Editor	Voyager	Dex	Liquid Diagrams
Chart Settings					
Chart Title	✓	✓	X	~	✓
Axis Titles	✓	✓	~	~	✓
Axis Range	~	✓	~	~	X
Axis Ticks	~	✓	~	~	~
Tick Labels	✓	✓	X	~	~
Color Coding	✓	✓	~	X	~
Legend	✓	✓	~	~	~
Background Grid	X	✓	X	~	X
Other Features					
Tabular Data Preview	✓	X	X	✓	✓
Responsive Charts	✓	✓	X	~	X

✓ Fully supported ~ Partially supported X Not supported

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