Sketch2Vis Dataset DSL Grammar Notebook

The Sketch2Vis adopts multiple synthetic mechanisms to generate hand-drawn-style data visualizations to overcome dataset challenges in training deep learning models. This notebook shows the complete DSL grammar of the current dataset used in our experiments with examples.

By adopting this idea, the Sketch2Vis dataset can be easily extended from the current configuration by implementing more complex visualization types and parameters.

The DSLs in our experiments are generated with the following sources

1.**Matplotlib**

```
<plot>
    <structure>
        <type> line </type>
        <marker> X </marker>
        <linestyle> -- </linestyle>
        <is_line_legends> False </is_line_legends>
    </structure>
</plot>
```

2.**roughViz**

```
<plot>
    <structure>
        <type> bar </type>
        <simplification> 0.5 </simplification>
        <hBar> False </hBar>
        <fillStyle> zigzag </fillStyle>
    </structure>
</plot>
```

3.**Photo-Sketching**

```
<plot>
    <structure>
        <type> box </type>
        <mono> True </mono>
        <vert> True </vert>
    </structure>
</plot>
```

Sketch2Vis DSL Structural Token

Name	Description
<plot>	Starter of a Sketch2Vis DSL file
<structure>	Starter of a visualization instance, which works when there are multiple visualizations in one plot.
<type>	Plotting type of a visualization instance.

Matplotlib

Matplotlib is a popular Python 2D visualization library that generates quality visualizations [1]. We apply XKCD() function to generate hand-drawn style visualization.

The following Table shows available parameters in our current dataset. Unpredictable parameters are used to generate random visualization.

Parameter	Description	Values	Apply to	Predictable
align	Alignment of the bars to the x coordinates	['center', 'edge']	Bar	True
color	The colors of the bar/marker faces	['b','g','r','c','m','y','k']	Bar, Scatter	True
edgecolor	The colors of the edges.	['b','g','r','c','m','y','k','w', 'face', 'none']	Bar, Box	True
line_style	Style of plotted line	['-', '--', '-.', ':', '']	Line	True
line_color	Color of plotted line	['b', 'g', 'r', 'c', 'm', 'y', 'k']	Line	True

line_marker	Style of plotted marker	[".", ",", "o", "v", "^", "<", ">", "1", "2", "3", "4", "8", "s", "p", "P", "*", "h", "H", "+", "x", "X", "D", "d", "", "_", None]	Line, Scatter	True
is*line*legends	Show legends in plots	[True, False]	Line	True
explode	Offsetting a pie slice	[True, False]	Pie	True
ring	Pie chart or donut chart	[True, False]	Pie	True
sketch	Draw pie chart without color	[True, False]	Pie	True
shadow	Draw a shadow beneath the pie	[True, False]	Pie	True
vert	Vertical boxes or horizontal boxes	[True, False]	Box	True
title	Title of visualization	random text	Bar, Line, Box	False
x_label	Labels of x variables	random text	Bar, Line	False
y_label	Labels of y variables	random text	Bar, Line	False
line_legends	Text of legends in Line charts	random text	Line	False
notch	Notched box plot or rectangular boxplot	[True, False]	Box	False
showfliers	Show the outliers beyond the caps	[True, False]	Box	False
startangle	The angle by which the start of the pie is rotated, counterclockwise from the x-axis.	Number from 0 to 90	Pie	False
			Bar, Line,	

fontSize	Size of font	Number of font size	Box, Pie,Scatter	False
font	Handwriting-style font	String of font	Bar, Line, Box, Pie,Scatter	False
textPosition	Position of text	Position based on (x,y)	Bar, Line, Box, Pie,Scatter	False

RoughViz

roughViz.js is a JavaScript library to generate hand-drawn style visualizations in the browser [2].

The following table shows available parameters in our current dataset. Unpredictable parameters are used to generate random visualization.

Parameter	Description	Values	Apply to	Predictable
simplification	Chart simplification	[0.2, 0.5, 0.85]	Bar, Line, Pie	True
hBar	Vertical bars or horizontal bars	[True, False]	Bar	True
fillStyle	Bar/Pie fill-style	['hachure', 'cross-hatch', 'zigzag', 'dashed', 'solid', 'zigzag-line']	Bar, Pie	True
legend	Show legends in plots	[True, False]	Line, Pie	True
marker	Whether or not to add circles to chart.	[none, circle]	Line	True
legendPosition	Position of legends	[left, right]	Line, Pie	True
ring	Pie charts or donuts charts	[True, False]	Pie	True
		['coral', 'skyblue', 'tan',		

color	Colors for markers	'#8da0cb', '/', 'tan', 'orange']	Scatter	True
point-radius	Radius of circles points	[2, 5, 8]	Scatter	True
xLabel	Labels of x axis	random text	Line, Scatter	False
yLabel	Labels of y axis	random text	Line, Scatter	False
title	Title of charts	random text	Line, Scatter, Bar, Pie	False
roughness	Roughness level of chart	Number from 1 to 10	Line, Scatter, Bar, Pie	False
axisRoughness	Roughness for x and y axes	Number from 1 to 10	Line, Scatter	False
circleRoughness	Roughness of circles	Number from 1 to 10	Line	False
fillWeight	Weight of inner paths' color	Number from 0 to 1	Line, Scatter, Bar, Pie	False
font	Font-family to use	Handwriting Font	Line, Scatter, Bar, Pie	False
stroke	Color of lines' stroke	String of a color	Line	False

Photo-Sketching

Photo-Sketching is a style transfer deep learning model [3] that we performed on sources images generated by Matplotlib to create simple monochromatic sketches.

Parameter	Description	Values	Apply to	Predictable
mono	This is a monochromatic sketches	[True]	Scatter, Pie,Bar, Box,Line	True
ring	Pie charts or donut charts	[True, False]	Pie	True
align	Alignment of the bars to the x coordinates	[center, edge]	Bar	True
vert	Vertical boxes or horizontal boxes	[True, False]	Box	True
is*line*legends	Show legends in plots	[True, False]	Line	True

Reference

[1] https://matplotlib.org/stable/index.html

[2] https://github.com/jwilber/roughViz

[3] Li, Mengtian, et al. "Photo-sketching: Inferring contour drawings from images." 2019 IEEE Winter Conference on Applications of Computer Vision (WACV). IEEE, 2019.