NL4DV-Stylist – A Python Toolkit for Styling Data Visualizations Using Natural Language & Example Charts

Background – Natural language interfaces (NLIs) support creating visualizations (VIS) using NL but often neglect design customizations, e.g., to satisfy personal preferences or brand needs.

Overview – Our NL to VIS toolkit enables users to provide one or more Example Charts with *"Text Instructions"* to extract specific design aspects and incorporate them into the output VIS.

Example – Output a Grouped Bar Chart with Red-Green Bars

Website Traffic Dataset

"Visualize Website Traffic by Source over the Years."

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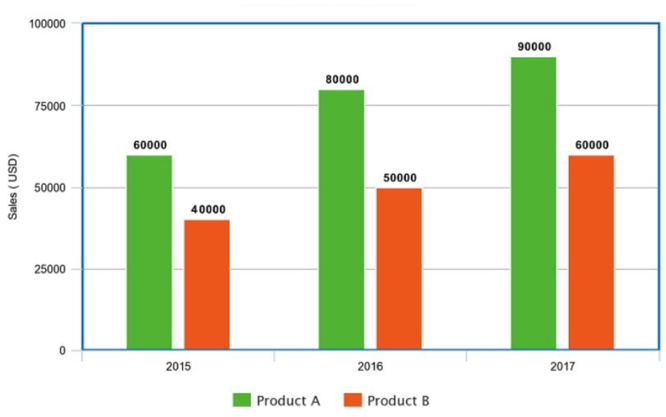
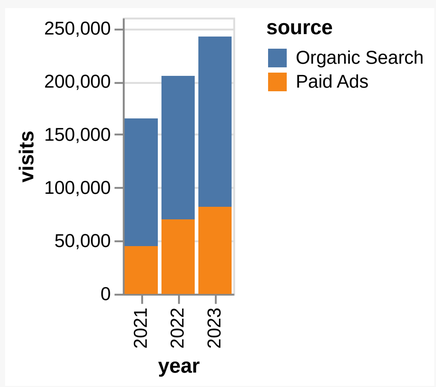
Example Chart



"Apply design aspects (e.g., styles, layout)."

Current NLIs



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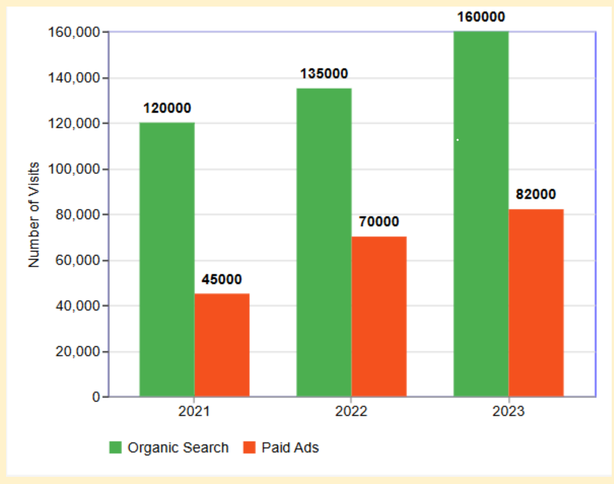

3-Step Workflow

1 Extractor

A VLM extracts desired design elements (e.g., styles, layouts) from the example charts.

2 Mapper

A VLM maps the extracted elements as Vega-Lite specifications.

3 Consolidator

A VLM consolidates the mapped specifications and resolves any design conflicts in the process.

Another Example – Incorporate Specific Design Aspects from Multiple Example Charts

Soccer Players *"Trend of average goals by player age."*

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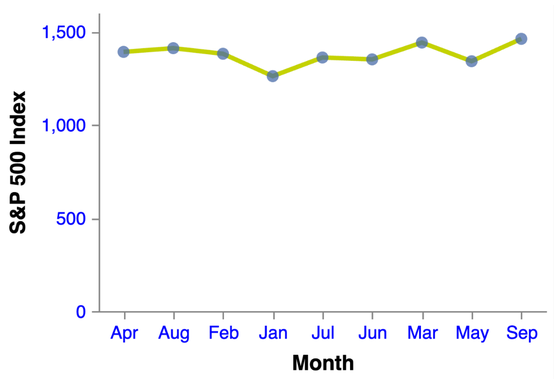
Example Chart 1



"Apply line, axes styles."

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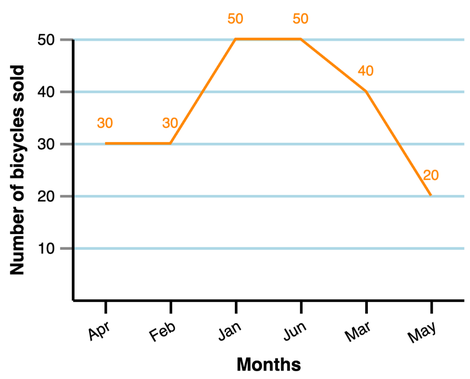
Example Chart 2



"Apply gridline style."

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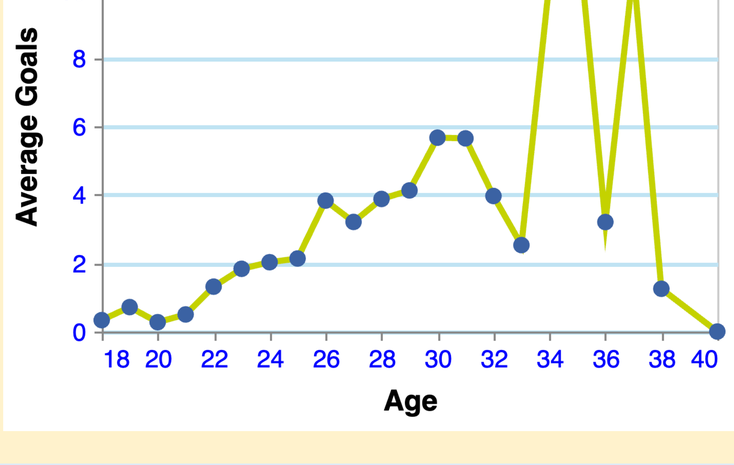

Ongoing Work – Benchmark Vision Language Models and study (1) how well chart layouts and styles can be recovered from images and (2) how well subsequent style transfers perform.

nl4dv.github.io
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