Enhancing and Comparing the Performance of LLM-based Data Visualization Methods in Chat2VIS

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Original Paper Overview: The paper “Chat2VIS: Generating Data Visualizations via Natural Language Using ChatGPT, Codex, and GPT-3” generates visualizations from natural language using OpenAI LLMs, translating instructions into Python code to display charts.

Problem Statement: In paper’s case study part, the author used 6 cases to show ChatGPT behaved better than NL4DV and nvBench in data visualization. Under the rapid development of LLM, we don't know if the results still valid. Besides, the author also expressed a hope of compare more LLMs including YoloPandas.

Moreover, the author mentioned the analysis graph outputs are primitive, fixed, far from satisfactory for direct research use.

Proposed Improvement: Our project aims to rebuild the web app, adding new LLMs (ChatGPT 4o mini, 4o, o1, gemini, NL4DV, ncNET, YOLOPandas) and more advanced visualization options, such as customizable colors, shapes, fonts, and legends.

Impact of Improvement: By incorporating new LLMs and enhancing customization, we can compare LLM performance in data visualization and improve user experience. However, updated models may cause different prompt outputs, though the core ideas remain the same.

Original Paper Reference

P. Maddigan and T. Susnjak, "Chat2VIS: Generating Data Visualizations via Natural Language Using ChatGPT, Codex, and GPT-3 Large Language Models," 2023. DOI: 10.1109/ACCESS.2023.3274199. https://ieeexplore.ieee.org/document/10121440

Project Scope:

1.Goals and Improvements:

1.1 **Import new LLM:** ChatGPT 4o mini, 4o, o1; NL4DV; ncNET and YOLOPandas.

1.2 **Compare performance** (**Finishing "Future works" part):** We will use more case studies to test data visualization performance among different LLMs.

1.3 **New features** (**Solving "Remaining challenges" part):** provide advanced customization including color changing, shape and font options, label and legend styling and more.

1.4 **New prompt formats:** redesign prompt formats for LLM models to achieve a flexible data representation.

Novel Aspect

Our project enhances Chat2VIS with new LLMs, improved performance comparisons, and full customization features, making the web app more practical.

Technology Stack:

Languages: Python, JavaScript

Libraries: numpy, streamlit, pyecharts

APIs: LLM APIs for natural language processing

Frameworks: Streamlit.