**Compare the performance of different LLM data visualization tools Based on Chat2VIS**

**Group Number**: 13

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**Original Paper Overview:** The original paper "Chat2VIS: Generating Data Visualizations via Natural Language Using ChatGPT, Codex, and GPT-3 Large Language Models" generates data visualizations from natural language descriptions. By using OpenAI LLMs, the system essentially translates user natural language instructions into python code and displays analysis charts and graphs.

**Problem Statement:** In paper’s case study part, the author used different LLMs and made simple comparation. The author used 6 case study to show ChatGPT behaved better than NL4DV and nvBench. With the rapid development of LLM, we don’t know whether the conclusion is still valid nowadays. 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 used in data visualization field base on the paper’s idea. We’ll import new LLMs to finish the author’s future work including ChatGPT 4o mini, 4o, o1; gemini; NL4DV; ncNET and YOLOPandas and compare their performance.

Besides, we will introduce powerful data visualization library realizing advanced visualization settings for users to customize which include color schemes, shapes, fonts, labels, legends and more.

**Impact of Improvement:** By enhancing Chat2VIS with importing new LLMs and adding additional customization features, we can research and compare the performance of language models in data visualization. Also, we will significantly improve user experience and make it more useful by adding chart customization function.

However, one unknown side effect of LLM model update would be the difference of prompt output results from the paper, but the logic and ideas behind 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 and visualization libraries achieving flexible data representation.

**Novel Aspect**

Our project extends the Chat2VIS framework by adding new LLMs, comparing the performance and making a full suite of customization tools with brand-new UI/UX. With our work, the web app will become more practical.

**Technology Stack:**

Languages: Python, JavaScript

Libraries: numpy, streamlit, pyecharts

APIs: LLM APIs for natural language processing

Frameworks: Streamlit.