Graduate School of Science and Technology Master's Thesis Abstract

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Abstract

Large Multimodal Models (LMMs) offer promising capabilities for interpreting visualizations and generating corresponding code, but their effectiveness in real-world notebook environments remains uncertain. This study evaluates how well LMMs can generate executable code from visualization images in Jupyter notebooks. We find that LMMs often rely on standard libraries, such as matplotlib and seaborn, reflecting human-like coding practices. However, only about half of the generated code is executable, with most failures caused by missing context, particularly the absence of real data. Even when code executes, the resulting visualizations often differ from the original images in both appearance and detail. Among visualization types, frequency and distribution plots achieve higher execution success and better visual similarity, while more complex plots perform poorly. Overall, while LMMs show potential for assisting code generation from visualizations, they still face key limitations in reliability, especially when generating code solely from images without contextual information. These findings suggest that LMMs could help support tasks such as reproducing analyses or assisting novice users in data visualization, but require careful integration and additional context to be practically useful.