Team members:

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Project Idea:

We aim to develop a tool that automatically converts colored visualizations into texture visualizations.

Motivation:

Textures in visualization design have been recognized as an accessible alternative to colors. They are helpful for color-blind individuals and useful for low-color displays (such as e-ink) and physical printouts. However, despite their proven effectiveness and the exploration of the design space, textures are still rarely used in practice and likely cannot (and perhaps should not) replace the dominant role of color in visualization design. To bridge this gap, we propose a tool to convert the colored visualizations into textured visualizations. The main purpose is to reduce the cost of manual editing and make the process as automated as possible.

Tentative Plans:

Previous work has extensively explored the design spaces of both colors and textures. Our goal is to bridge these two spaces by examining their patterns in categorical, ordinal, and quantitative data and developing a method to map between them. This mapping could be manually constructed or generated using machine learning approaches, depending on dataset availability. Additionally, our software must detect and identify different colored elements within visualization charts and determine their associated data types.

1. Explore the literature on the design spaces of both color and textures in visualization: This is needed to classify the textures used based on data types and representations.
2. Segment identification (different colored parts) and data extraction (data types) from input plots: This is needed to extract information from input plots for later mapping to texture
3. Infer data type-specific textures (manually or through ML - depends on the availability of training data): This step should be able to generate proper texture based on the data representation.
4 Implement software (ML) to automate the process: Automation involves mapping input plots to textured output plots.

Relevance to ML:

First of all, an important step of this project would be using ML approaches to segment and label different colored parts of the visualization. Second, we may employ ML approaches to build the mapping between colors/data types and textures.