InfoColorizer: Interactive Recommendation of Color Palettes for Infographics

Linpeng Yuan, Ziqi Zhou, Jian Zhao, Yiqiu Guo, Fan Du, Huamin Qu
Introduction

Infographics

Left: https://fi.venngage.com/templates/infographics/patient-wait-time-statistical-timeline-76e84d08-7c70-48bc-8cb4-3f6e1a066d58
Right: https://visme.co/blog/timeline-infographic-template/
Introduction

Infographics

shapes
icons, indices, text

01
LOREM IPSUM
Introduction

Color Palette Design

Designing effective color palettes for an infographic needs to consider many factors simultaneously.

- spatial layout
- semantic meaning
- aesthetics
- perceptual effectiveness
Introduction

Challenges

Creating a palette from scratch requires users to have relevant expertise.

Using predefined palettes limits users’ freedom.

Applying a palette to an infographic is complicated due to the spatial layout of elements.

VIS 2021
Introduction

Goals

1. G1: Lower expertise barrier for crafting professional palettes.
3. G3: Offer flexibility to embed different kinds of user preferences.
4. G4: Support simple user interactions and iterative design of color palettes.
InfoColorizer
An interactive tool that allows general users to effectively design color palettes during infographic creation, using a data-driven approach.
InfoColorizer

Pipeline

Recommendation Engine

Training Data

VAEAC

Recommendations

Visual Interface

User Preferences

bind the same color

set color

Feature Extraction

Infographic Editing

VIS2021
InfoColorizer
Characterize Infographics with Various Features

VIS 2021
InfoColorizer
Characterize Infographics with Various Features

Color Features: \([L, a, b]\)

Non-color Features:
- size, visual group numbers
- visual information flow
- spatial layout of elements
- ...

Node 1

Node 2

Non-color Features

Color Features

VIS 2021
G2: Consider spatial arrangements of elements.
InfoColorizer

Lower Expertise Barrier with Recommendation

G2: Consider spatial arrangements of elements.

G3: Offer flexibility to users for their color preferences.
The recommendation process is framed as a conditional generative problem, and three models are considered: VAEAC (Ivanov et al., 2019), GAIN (Yoon et al., 2018), and MICE (Buuren et al., 2011).

<table>
<thead>
<tr>
<th></th>
<th>NRMSE</th>
<th>CRS</th>
<th>CVS</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAEAC</td>
<td>0.6543</td>
<td>2.4826</td>
<td>5.6748</td>
</tr>
<tr>
<td>GAIN</td>
<td>2.4574</td>
<td>4.1742</td>
<td>4.1075</td>
</tr>
<tr>
<td>MICE</td>
<td>15.6098</td>
<td>16.5096</td>
<td>27.6199</td>
</tr>
<tr>
<td>VAEAC (non-spatial)</td>
<td>1.1536</td>
<td>3.6874</td>
<td>6.429</td>
</tr>
</tbody>
</table>
The idea of the conditional generation behind VAEAC with an example of how spatial arrangements influence the recommended colors:
InfoColorizer
Support User Workflow with Visual Interface
Evaluation

- Case Study
- Controlled User study
  Novice Creators
- Survey Study
  Infographic readers
- Interview Study
  graphical design experts

Results of Controlled User study

Results of Survey Study

VI2021
Conclusion

Contributions

• A novel data-driven approach that recommends palettes for infographics by leveraging deep learning techniques with the consideration of elements’ spatial arrangements, while offering flexibility for user preferences of colors.

• An interactive tool, InfoColorizer, that incorporates the data-driven recommendation and makes it easily accessible and manageable to users, along with the support of iterative design and basic infographic editing.

• Insights and results from a series of evaluations covering case studies, a controlled user study, an online survey, and an interview study.