

MapColPal – a color palette generation and testing tool for thematic maps

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Color is a crucial part of cartographic visualization while simultaneously posing many challenges to the cartographer working on it. Creating and testing self-made color palettes for maps instead of relying on standard palettes requires manual effort, time, and expertise. Tools to aid in the cartographic design process with a limited scope and high depth became known as cartographic brewers [1], with ColorBrewer [2] as one of the most influential examples among them.

ColorBrewer helps to work with and understand properties of color palettes more easily. And yet, there are limitations to it: It features only a selection of pre-created color palettes for one map layer at a time and presents these palettes only applied to a choropleth map.

What could a tool look like which improves on previous applications like ColorBrewer to assist cartographers in choosing color palettes for thematic maps?

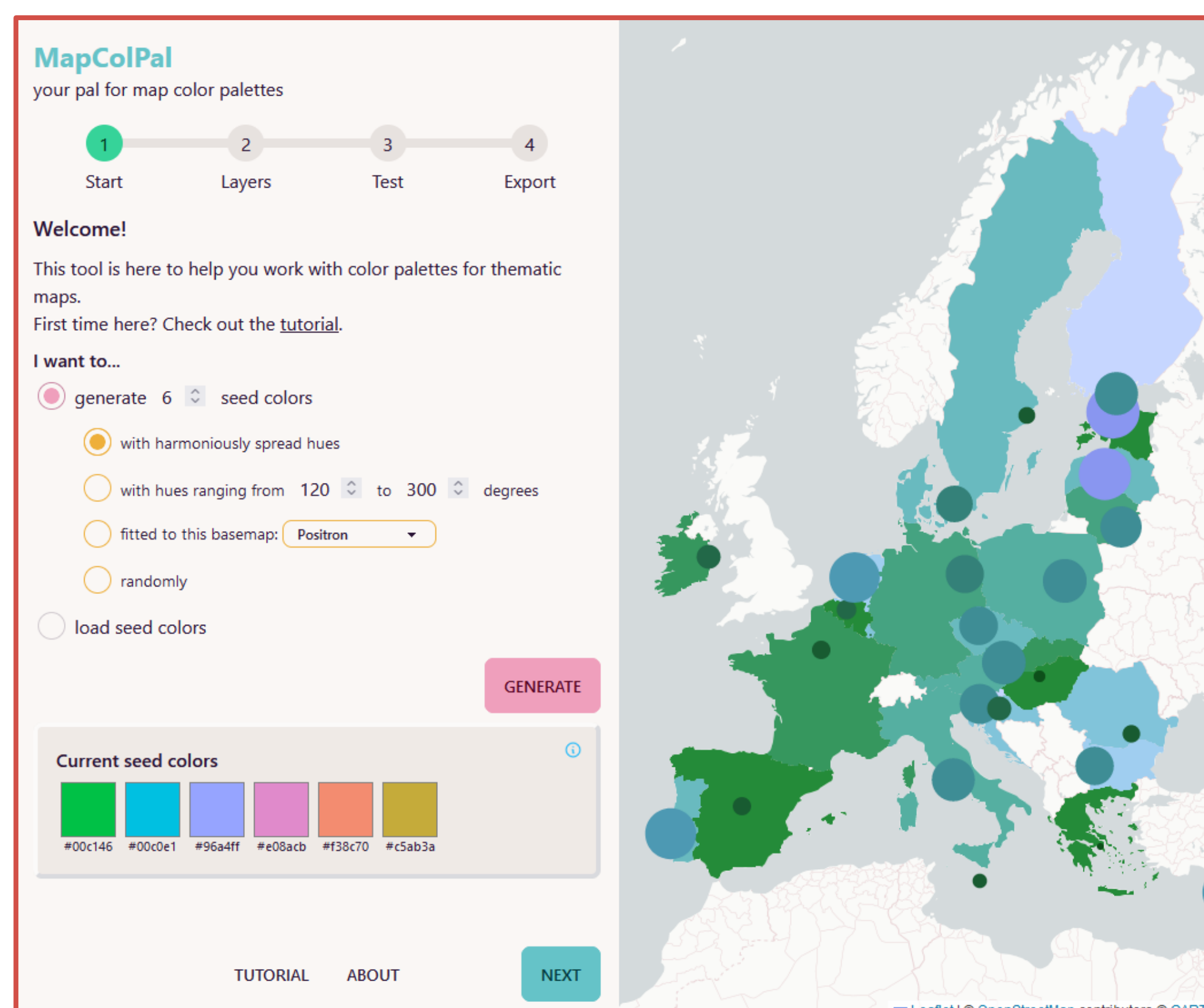
SCOPE

The general research objective of this thesis is to *design, build, and evaluate a tool to assist cartographers in choosing suitable color palettes for thematic maps.*

For the cartographer to be able to choose a color scheme well, the tool combines relevant information on color palette design with a palette generation algorithm and a testing environment to visualize and assess the palette in relevant situations without the need to export a potential palette to other applications.

METHODOLOGY

The main methods chosen to reach the research objective were requirements engineering, to identify requirements for the proof of concept from the scientific background and related work on color palette tools, prototyping, to then iteratively implement a proof of concept from these requirements, and heuristic evaluation, to assess whether the requirements could be met by the proof of concept.



The MapColPal proof of concept.

RESULTS

A functioning, coded, proof of concept was implemented and can be accessed online at <https://mapcolpal.org/> with the source code available under the MIT license at the following repository: <https://github.com/justvalerian/mapcolpal>.

The proof of concept could meet 11 of the 19 requirements set before, 5 requirements were partly met and 3 were not met. The main features missing are regarding automated palette checks.

In the heuristic evaluation, 20 of 28 heuristics set to the user experience of the proof of concept were passed, with 5 heuristics unclear and 3 not passed. The main user experience aspects to be improved include simplified wording within the app and the provision of more information contextually to make the application more accessible to cartographers with less knowledge about color design.

The proof of concept allows for the creation of sequential, diverging, and qualitative color palettes based on seed colors which can be based on a hue template to assure color harmony.

CONCLUSION

In this thesis, MapColPal, a web-based color palette generation and testing tool for thematic maps, was designed, built, and evaluated. It provides a new take on the old problem of selecting colors for maps in a way suiting the data, human perception, and aesthetic preferences.

MapColPal tackles this problem by deriving color palettes in a structured way from a shared set of seed colors, visualizing each update immediately, as well as offering user interaction and palette testing at all steps along the process.

It builds on previous tools like ColorBrewer and combines their ideas with insight from recent literature and modern technology.

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KEYWORDS

color palette generation, color palette testing, thematic cartography, cartographic design, requirements engineering, prototyping, web development

REFERENCES

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