The color palette extension is not quite clear to me what it is and how to do it. A color palette is basically a set of discrete data points in a color space. What is meant by a ‘closure’ of this set of colors by means of an ‘area’ or ‘linear’ function?

Thank you for your question. What I mean by this is the following: once the discrete data points of a color palette with 20 colors are plotted in color space there might be a way to connect the data points. If these data points are located on a hyperbolic function it is more safe to suggest that all data points on the hyperbolic function are colors belonging to the color palette. In other words, the color palette can be extended by all these data point colors. There might be another function or area underlying the patterns of the data points which should be the subject of the research.   
  
For the classification, I think I understand the idea, it’s basically about defining, implementing and testing a distance metric between an extracted image color palette and a given set of palettes. That’s an interesting and clear problem to solve.

Yes.   
  
The determination of the ‘best color combinations’, however, is not fully clear to me. The first part of finding matching colors is unclear to me, the image conversion in the end is more clear.

On finding matching colors: given a color palette of 3 colors red, green and blue the colors are combined pairwise: red-green, green-blue, and blue-red. Then a group of say 200 people are asked to rank these three color combinations, for example: blue-red, red-green, green-blue. The original image will have two predominant colors represented by two objects in the image. Those two objects will be converted from say green-blue to blue-red because it is the top ranked color combination. Following this procedure, the image will have the highest average popularity in terms of coloring.   
  
I also have not heard from Prof. Flückiger on her level of interest and possibility to help guiding the project. Since I also know that you are under time pressure, maybe you want to go ahead and sign up for another MSc thesis, which I would fully understand. Right now I see a possibility for this topic, probably after one more iteration together with Prof. Flückiger.