

Visualizing Grapheme-Color Synesthesia

Philip Sköld

November 5, 2014

ABSTRACT

Synesthesia is a neurological phenomenon where sensory or cognitive pathways are stimulated involuntarily when another is stimulated, resulting in a perceived “union of the senses” [1]. Synesthesia has only partly been evaluated by scientific research and being able to visualize forms of synesthesia is tool which will help further research on the phenomenon.

In this paper we propose a method of visualizing Grapheme-Color Synesthesia, a specific form of synesthesia where graphemes (for instance numbers and letters) are associated with color, is proposed. Using the Epson Moverio, different descriptions of perceived Grapheme-Color Synesthesia can be simulated and then be used as a tool for further research of Grapheme-Color Synesthesia (GCS) and Synesthesia in general.

1 MOTIVATION

Since GCS, and other forms of synesthesia, is perception based one must be careful when conducting experiments; As it is subjective and varies from person to person it is harder to so adhering to the scientific method[2].

Developing tools that mimics the perceived experience of having a form of synesthesia is useful for two purposes: it (1) helps give a broader, layman, audience an intuitive understanding of what it is like to live with synesthesia, and (2) it can help further research on synesthesia by matched control[3].

Below is a very high-level description of a method of using a virtual synesthesia within research

- let a synesthete explain his/her perception of the particular point of interest in the subjects synesthesia
- setup the virtual synesthesia to mimic the particular description of perception
- deviate on some specific point, ϕ
- predict whether the virtual synesthesia will make the same subject perceive ϕ differently or similarly

A better understanding of the synesthesia and the subjects personal perception/awareness of that synesthesia can be reached comparing the result perceived in real life to the one from the virtual synesthesia.

2 PROJECT SUMMARY

The project will focus on simulating GCS with the Epson Moverio. Using the camera on the Moverio, object recognition techniques will be used to recognize graphemes in the real world. Other Machine Learning classification algo-

rithms[4] will be used to map graphemes to color-schemes representing an instance of GCS. Finally, the Moverio screen will be used to color the graphemes in the corresponding colors, in an augmented-reality fashion.

References

- [1] *Synesthesia*, <http://en.wikipedia.org/wiki/Synesthesia>, Accessed: 2014-11-05.
- [2] *Increased structural connectivity in grapheme-color synesthesia*, <http://www.nature.com/focus.lib.kth.se/neuro/journal/v10/n6/full/nn1906.html>, Accessed: 2014-11-05.
- [3] *Matched case-control studies: a review of reported statistical methodology*, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3346204/>, Accessed: 2014-11-05.
- [4] *Statistical classification*, http://en.wikipedia.org/wiki/Statistical_classification, Accessed: 2014-11-05.