The Zero-Color Theorem: An Optimal Poster Design Algorithm

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ABSTRACT

Authors of academic posters frequently toil needlessly over their poster designs. In this paper, we show that the optimal number of colors for an academic poster is 0, significantly reducing the cost of poster production.

Keywords

Design; Algorithmic Presentation

1. INTRODUCTION

The problem of designing posters for academic conferences and other presentations has plagued numerous previous authors. The Cornell Center for Materials Research, for example, advises avoiding making one's poster resemble an abstract painting [2]. However, common poster designs fail to take into account the practicalities of how posters are actually used in the real world, leading researchers to develop severely suboptimal poster designs. In this paper, we show how to design the optimal poster, taking into account the actual usage pattern that is common of real academic posters. The paper culminates in a proof of the zero-color theorem, which gives optimal design guidance for academic posters. This is particularly useful for new members of the academic community, who may be tempted to use a suboptimal design for their posters.

2. ACADEMIC POSTER USE CASES

Traditionally, researchers have assumed that posters should be designed to impress potential viewers. This approach can be modeled as attempting to maximize B, the benefit of the poster presentation:

$$B = \sum_{i=1}^{n} B(v_i) \tag{1}$$

where v_i is the label of a particular viewer and B is a function that gives the benefit to the presenter of a particular viewer being impressed by the presenter's research. As $n \to \infty$ and $B(v) \to \infty$, it would seem that it would be optimal to expend an arbitrary amount of resources on poster creation.

Unfortunately, this approach fails to consider the overall poster lifecycle. The typical poster presentation lasts approximately an hour and a half [1]. However, after a poster is printed, it has an indefinite lifetime, potentially longer than that of the researcher who designed the poster. Some posters may last in excess of 1,000 years [4]. During the rest of the poster lifetime, the poster is typically stored inside a poster tube. As the poster lifetime l approaches ∞, the fraction of the poster's lifetime spent in the display configuration approaches zero.

This observation leads to a novel result in poster design. Instead of optimizing for the nearly-nonexistent portion of the poster's lifetime in which it exists outside a poster tube, posters should be instead optimized for use *inside* poster tubes.

3. THE ZERO-COLOR THEOREM

In this section, we derive the optimal poster design of a poster for display inside a poster tube. Since the face of the poster is unobservable, one might initially assume that the content of the poster is inconsequential. Unfortunately, this is not the case. In fact, ink is quite expensive. As of 2011, ink cost approximately $0.70 per mL, which is nearly twice the cost per mL of human blood [3]. Consider the number of colors, n used in the printing of a poster, where "used" means that a positive quantity of ink for the color has been expended in the poster's production. If $n > 0$, then the cost of ink, c, exceeds 0. But by assumption, no one can see the colors used in a poster while it is in a poster tube. Therefore, there is no benefit to using a nonzero number of colors. Since the cost of $n > 0$ is positive, we conclude that 0 is the optimal number of colors for a poster.

4. FUTURE WORK

Readers may observe that the theorem proved in this paper leads to a substantial simplification of the poster design process. Unfortunately, the problem of poster design is still complex and requires further study. Paper comes in an astounding array of different colors and finishes; though the result in this paper provides design guidance regarding number of *printed* colors, further work will be required to determine the optimal paper color and type.

5. CONCLUSIONS

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Present at poster sessions with blank posters. Those who heed this advice will save their departments valuable funds and retain their access to the real point of poster sessions, namely snacks and drink tickets.

6. REFERENCES

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