Eco Image Printing

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INTRODUCTION

  SPRANQ developed Ecofont in 2009. Ecofont has many tiny holes inside the character. It reduces the amount of ink by approximately 15 percent. It is based on the idea that ink do spread over the paper. So even though there are holes in them, it still looks plausible.
  But as you might notice, there aren't only characters on the paper. There are lots of images also. That's why we start to think about Eco Image Printing. There were several tries to put the 'ink-saving' function on the printer. The result was not that much good. They just saved under 10 percent of ink, and even its visibility was not good. It's because they just tried to decrease the resolution. However, our solution is saving more ink, with almost no decreasing of the resolution. So, here we introduce the vivid Eco Image printing which saves about 20% ink using geometry information of image.

THEORY

Color printing uses the CMYK color model which is subtractive color model. CMYK refers to the four inks: Cyan, Magenta, Yellow, and Black. Because color inks are only four kinds, the printer must use halftone and mix it on the paper.
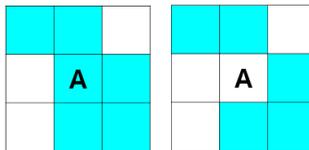
Figure 1 Halftone of the original image (left) and reduced halftone of the original image (right)

METHODS

  We suggest an application which helps to save the ink. The algorithm for Echo Image Printing is as followings.
  1. Decompose image into 4 halftones: Cyan, Magenta, Yellow and Black.
  2. Compute the geometrical distribution of each halftone.
  3. Remove redundant vertex which is surrounded by color blocks. (Figure 1)
  4. Synthesize the image or print halftones directly.

CONCLUSION

  Whereas previous saving strategy saves under 10 percent of inks, user can save as much as they want through our suggestion. We defined 3x3 blocks on some region (figure 1). We can remove of 'A' block if there are enough blocks around it. And the degree of 'enough' depends on users tasty. For example, in Figure 3 user defines the degree over uses 44.4%. In this time, the printer uses 16.7% ink less than before. Eco Image Printing saves ink efficiently. It reduces the cost of printing also. This could apply current printer system in your home or company by installing additional software. So it does not need initial cost at all. Furthermore, it makes the ecosystem smile with users and the earth's satisfaction.