Title: Structure-based ASCII Art

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Non-confidential abstract: ASCII art is a technique of composing pictures with text characters. It stemmed from the inability of graphical presentation on early computers. Even with the wide availability of digital images and graphics nowadays, ASCII art remains popular due to the enormous growth of text-based communication channels over internet and mobile communication network, such as instant messenger systems, Usenet news, discussion forums, email and short message service (SMS). More importantly, ASCII art has already evolved into a popular art form in the cyberspace. Simleys (e.g. :) are in fact the simplest ASCII art. In Japan, it is called “facial text” (顔文字).

There are two types of ASCII art, tone-based and structure-based. Tone-based ASCII art maintains the intensity distribution of the reference image, and it can be generated by halftoning approach. But the quality is very poor (blurry and hard to recognize). On the other hand, structure-based ASCII art approximates the major line structure of the image content with the shape of characters. Its results are usually clearer, more impressive and attractive, comparing to the tone-based ones. However, there is no existing method which can automatically and effectively generate the structure-based ASCII art. Because it is very difficult to represent the unlimited image content with the extremely limited shapes and restrictive placement of characters. So, all existing structure-based ASCII art pieces are done by hand.

Our novel technology automatically generates high-quality structure-based ASCII art that is comparable to the manual creation. We propose a novel alignment-insensitive shape similarity metric that tolerates misalignment of shapes while accounts for the difference in position, orientation, scale. Together with the constrained deformation approach, we formulate the ASCII art generation as an optimization process that minimizes the shape dissimilarity and deformation. With our technology, impressive ASCII art can be generated in a very short period of time (while manual creation requires hours of work), and hence can popularize the usage of structure-based ASCII art over mobile text-based communication channels like SMS and instant messenger. With this technology, users can upload their own images to server and download the resultant ASCII arts for sending, say SMS.