Changing the Ratio of an Image Intelligently According to Its Contents: An Image Processing Tool Based on Pixel Weight and Face Detection

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Objective: To meet the need for changing the ratios of pictures in different situations, this paper presents an image processing tool which can intelligently resize the pictures according to their contents. Compared with the traditional methods which pull and push the pictures directly or cut the pictures, this program can avoid making the important contents distorted or lost. Methods and Results: The program gave every pixel in an image different weight to indicate how important it was. Then, with the help of dynamic programming, the program deleted the seam containing the smallest sum of weights, which meant the program just deleted some useless pixels in order to reserve the important contents while changing the ratio of pictures. There were also two improvements in the final program. One was face detection, which was a supplement to the pixel weight, for the faces were an exceptional situation for the pixel weight. The other one was customization, which allowed users to choose which parts of the image they specifically wanted to reserve and then the seams found by my program would avoid this part. Conclusion: This program can be applied in photo printing, graphic designing, screen displaying, and other practical applications in our daily life. The paper has three innovations: in science, pixel weight and face detection are innovations of algorithm; in technology, customization function can meet users' more special needs; in application, the program is a useful tool suitable for various fields. Keywords: pixel weight; face detection; dynamic programming; customization; image resizing

Awards Won:

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