Application of Face-Recognition to Seam-Based Content-Aware Image Resizing: A Project Proposal

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1 Purpose

My project will apply face-recognition to a seam-carving algorithm which can change the aspect ratio of images, such that the data around human faces is automatically preserved, without faces having to be tagged by hand. In its current iteration, seam-carving works well on images such as landscapes, but will not perform well on images of human faces. My project will begin as a reimplementation of an algorithm for seam-carving using available open source libraries, and then progress to the implementation of an algorithm for face-recognition. Eventually the two will be combined.

2 Background

There are already algorithms which use seam-carving to perform content aware image resizing. The current algorithms do not function well around human faces, generally distorting them. A wide vareity of research has been conducted on related subjects. Several research papers exist on edge detection in noisy images, image recognition, content-based image indexing, and image mosaicking. MIT's photobook project is an interesting project which can use a database of images to index and detect other, related images, and has applications in face and gesture recognition.

3 Procedure and Methodology

My project will be implemented in C, using commonly available, open source libraries for seam-carving to perform image resizing and seam-finding functions. After image resizing is successfully implemented, I will test the program on a wide vareity of image formats, verifying the output. The next step will be to modify the code to MIT's photobook application, building a database of human faces, and creating a system which is capable of automatically tagging them in new images and writing this data out to an XML file.

4 Testing and Analysis

My program will be tested dynamically, over a vareity of test images. When I find an input which causes the program to fail, I will test it on similar images in order to analyze the code to find where the problem is. Eventually, my program will be able to resize images and change their aspect ratios without damage to the significant content, and its effectiveness will be affected verified through human inspection.

5 Expected Results and Impact

The application of face-recognition to seam-based image resizing would enable web browsers or other content display programs to dynamically resize images to fill the available space, without requiring manual tagging or marking of faces and other complicated content in pictures in order to protect the significant content.