Dynamic Image Resizing

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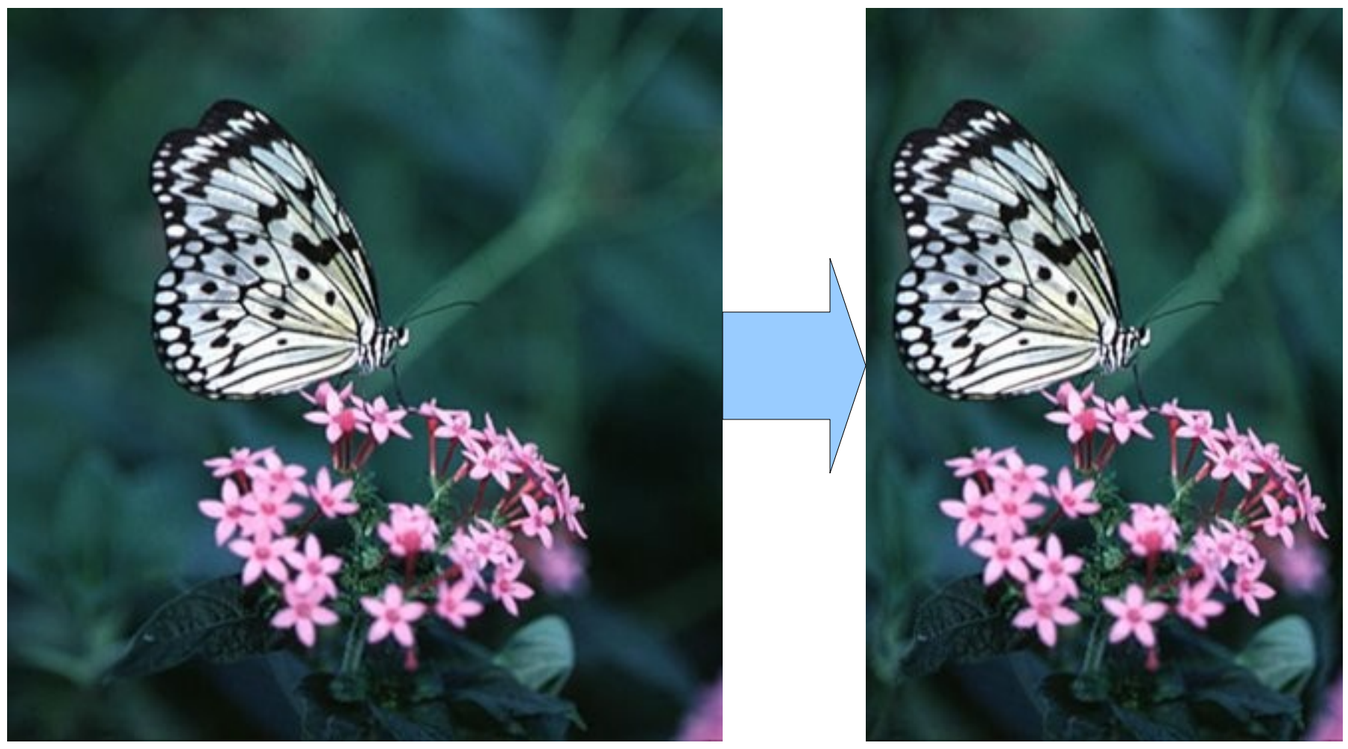
Abstract

The goal of this project was to be able to resize an image without distorting any important aspects of the image. Commons methods of resizing, including cropping and scaling, remove or distort some of the image and are thus undesirable. By finding the least important pixels and removing them, this dynamic resizing can be possible. These can be found by finding the change of intensity of each pixel to the next and taking away the ones with a very low change. Using this method, humans should be unable to tell if an image has been altered.



Background

Edge detection is being researched heavily in modern times. Many teams are trying to allow computers to see and identify objects. But there is also much research being conducted about images and modifying them. There is one project called PhotoSynth that is trying to take a large amount of images from the web, and from them, create a 3D model of whatever the images are of. There is also another project that is very similar to what I am trying to do, although I have some ideas for my project that they have not yet implemented.

Methods

Instead of cropping or scaling the image, both of which would ruin certain aspects, there is an algorithm that can find only the least noticeable pixels and remove them so that a human cannot tell the image has been altered. This algorithm finds the gradient magnitude of the image and removes the pixels with the smallest change of intensity.

To expand the image (bottom left), the same method is used, except instead of removing paths, the program adds a path next to it with the average values of the surrounding pixels.

Results

The image above is the original image. The one below it has been modified by the program. You can see both the butterfly and the flowers, both of which look unaltered, whereas scaling would ruin these. The unnecessary portions of the image have been removed.