An Animation in an Image:

Creating a short animation from a single image using digital image processing methods

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Introduction

This study aims to show the various digital image processing techniques and how these methods, when applied at different times and in a specific order to a certain area of an image, can create an animated scene.

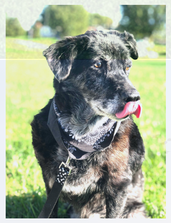
RGB (185,244,4)

Each pixel value in a RGB image conatins 3 color channels: red, green, and blue. The amount of each of these colors determines the color of the pixel, and this is called the RGB value.

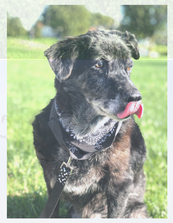
Digital image processing methods alter the RGB value at each pixel according to some algorithm. This changes the color of the pixel.

Digital image processing methods include greyscale, contrast, brightness, smoothing, and sharpening methods.

Greyscale method



Contrast method

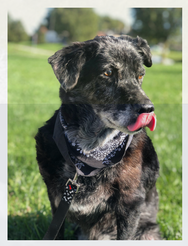


Brightness method

Image segmentation algorithms segment an image into regions based on either similar values, proximity and similar values, or proximity and dissimilar values.

Image segmentation algorithms include thresholding, regional growth, and edge detection algorithms.

Thresholding method



Regional growth method

Goal

To create a software that allows for users to apply image processing algorithms to certain parts of an image as it moves in order to simulate an animation.

Results

Users can use the software in order to select parts of an image and apply digital image processing effects while the image is in motion. These effects can be overlapped and applied in any order to any part of the image.

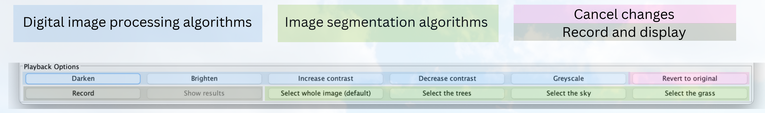
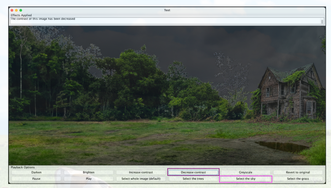


Image processing algorithms can be applied to these areas to create different results.



Using the research adjacent software, these image processing methods can be applied to an area over time to create the effect of movement.

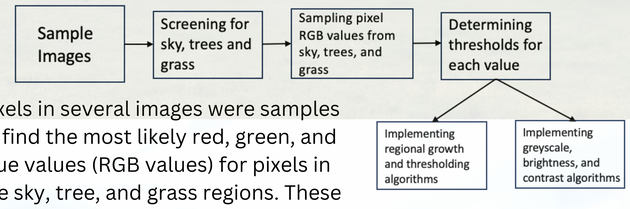
Sunset- sky darkening

Cloud movement- grass brightening and increasing contrast

Haze/fog- sky darkening and decreasing contrast

The image can be recorded and played back at a slower pace in order to view the changes made.

Methodology



Pixels in several images were samples to find the most likely red, green, and blue values (RGB values) for pixels in the sky, tree, and grass regions. These values were used to create upper and lower thresholding bounds.

Sky RGB Values	R Value	G Value	B Value	Grey Value
Upper	225	227	230	227
Lower	110	124	109	114

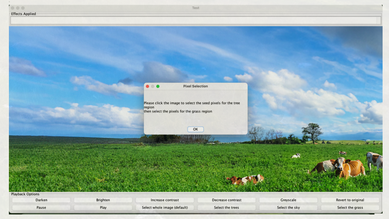
Tree RGB Values	R Value	G Value	B Values	Grey Value
Upper	55	47	40	48
Lower	3	7	5	15

Grass RGB Values	R Value	G Value	B Values	Grey Value
Upper	121	101	47	92
Lower	51	80	14	48

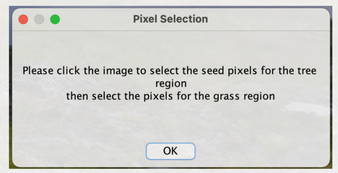
Digital image processing and image segmentation methods were implemented using these determined threshold values for each RGB color channel.

Software was created to house the images and allow for users to create their own animations.

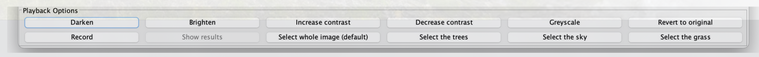
Initial viewport



Pixel selection prompt- users select the initial seed pixels to determine their own regions.



Buttons to be used



Future Iterations

- Combinations of regional growth and edge detection algorithms in order to increase accuracy between tree and grass regions
- Addition of geometrical methods such as translation, rotation, and shearing in order to increase the perception of movement
- Acceptance of additional image/uploading images prompt

The College of Wooster Computer Science Department