

ITEC 120

Lecture 24
Advanced Effects

Review

- Basic effects
 - Loading / Displaying
 - Solid color pictures
 - Black/White
 - Sepia

Advanced effects


Objectives

- Learn about more complex effects
 - Blending
 - Green screening
 - Blurring
 - Oil Painting

Advanced effects

Blending

- Combining pictures



The diagram illustrates the process of image blending. On the left, the Radford University logo (RU RADFORD UNIVERSITY) is shown next to a landscape image of a river valley. An equals sign follows, leading to the final blended image where the landscape is integrated into the letters of the logo.

Advanced effects

Algorithm

- Load two pictures of the same size
- Create new picture of same size
- New picture's pixels are 50% from first picture, 50% from the second
- Similar to blending sounds

Advanced effects

Code

```
public Picture blend(Picture one, Picture two) {
    Pixel[][] f = one.get2DArray();
    Pixel[][] s = two.get2DArray();
    Picture last = new Picture(f.length, f[0].length);
    Pixel[][] result = last.get2DArray();
    for (int i=0; i<f.length; i++) {
        for (int j=0; j<f[i].length; j++) {
            int r1, r2, g1, g2, b1, b2;
            r1 = f[i][j].getRed(); g1 = f[i][j].getGreen(); b1 = f[i][j].getBlue();
            r2 = s[i][j].getRed(); g2 = s[i][j].getGreen(); b2 = s[i][j].getBlue();

            result[i][j].setRed( (r1/2 + r2/2);
            result[i][j].setGreen( (g1/2 + g2/2);
            result[i][j].setBlue( (b1/2 + b2/2);
        }
    }
    return last;
}
```

Advanced effects

Guess the effect




Advanced effects

Background



Advanced effects

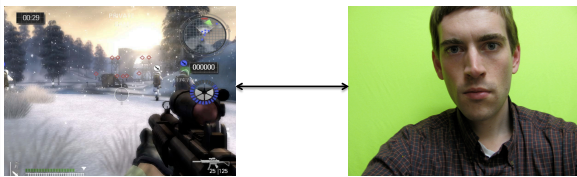
Get in the game



Advanced effects

Process

- Find a green pixel, replace with pixel from other picture



Advanced effects

Experimentation

- Print out r,g,b values and see if you can determine patterns
- Set specific values to black

Advanced effects

Only green


Green > 220



Advanced effects

Find a green pixel, set it to black (0,0,0)
Useful for seeing how good it is


Lower intensity Green > 170



Advanced effects

Experimentation

- Play around with more than just green
- May lead to unintended results



Advanced effects

Algorithm

`java -Xms32m -Xmx128m classname`


If you get a out of heap space error use this to run your program!

- Load two pictures (of the same size)
- Go through each pixel in source image
- If pixel is green, copy pixel from background over
 - High green intensity (green > 220)
 - Medium green and low blue ($G > 150$ and $B < 90$)

Advanced effects

Mirroring

- Make the bottom reflect the top



Advanced effects

Code

```
public void mirror(Picture pic)
{
    Pixel[][] val = pic.get2DArray();
    int width = val[0].length;
    for (int i=0; i<val.length; i++)
    {
        for (int j=0; j<val[0].length; j++)
        {
            val[i][width-j-1].setRed(val[i][j].getRed());
            val[i][width-j-1].setGreen(val[i][j].getGreen());
            val[i][width-j-1].setBlue(val[i][j].getBlue());
        }
    }
}
```

Advanced effects

Blurring

- Smoothing type effect
- Average r/g/b values around a pixel



Advanced effects

Code

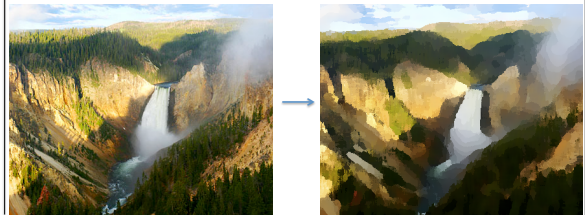
```
Pixel[][] pixels = input.get2DArray();
Picture output = new Picture(pixels.length, pixels[0].length);
Pixel[][] values = output.get2DArray();

int r,g,b;
int num=0;
for (int i=0; i<pixels.length; i++){
    for (int j=0; j<pixels[i].length; j++){
        r = pixels[i][j].getRed(); g = pixels[i][j].getGreen(); b = pixels[i][j].getBlue();
        num=1;
        for (int a=i-range; a < i+range; a++) {
            for (int c=j-range; c<j+range; c++) {
                if (a > 0 && a < pixels.length && c > 0 && c < pixels[a].length && a != i && c != j) {
                    r += pixels[a][c].getRed(); g += pixels[a][c].getGreen(); b += pixels[a][c].getBlue();
                    num++;
                }
            }
        }
        r/=num; g/=num; b/=num;
        values[i][j].setRed(r); values[i][j].setGreen(g); values[i][j].setBlue(b);
    }
}
```

Advanced effects

Oil Painting

- Blurring to the next level
- Make pixels like the ones next to it



Advanced effects

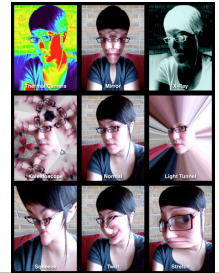
Complicated

- Range of pixels to look at (radius in a circle)
- Calculate intensity of each pixel within range of source pixel
- Create X bins for the entire spectrum (i.e. $255/X$)
- Determine number of pixels in each bin
- Target picture's pixel becomes the average r,g,b values of the pixels in the largest bin

Advanced effects

Review

- More complicated photography effects
 - Green screen
 - Blending
 - Oil painting
- Much more out there



Advanced effects