A visual method for generating the separating isosurface of two classes of objects in two-dimensional space

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Abstract

With regard to the separating isosurface of two classes of objects in two-dimensional space, the transition from nonlinear to linear is documented.

1 Introduction

Iron out the wrinkles by downsizing. Can also convolve the images, like blurring, which can be used to melt away higher-frequency detail.

References

[1] James, et al. An Introduction to Statistical Learning with Applications in R. ISBN: 978-1-0716-1417-4

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```
vector<float> opencv_downsize(const vector<float>& image, size_t res, size_t target_res)
{
    Mat m = Mat(static_cast<int>(res), static_cast<int>(res), CV_32FC1);
    memcpy(m.data, image.data(), image.size() * sizeof(float));

    float x = static_cast<float>(target_res) / res;

    resize(m, m, cv::Size(), x, x, INTER_LINEAR);
    vector<float> temp_image(target_res * target_res);
    memcpy(&temp_image[0], m.data, temp_image.size() * sizeof(float));

    return temp_image;
}
```

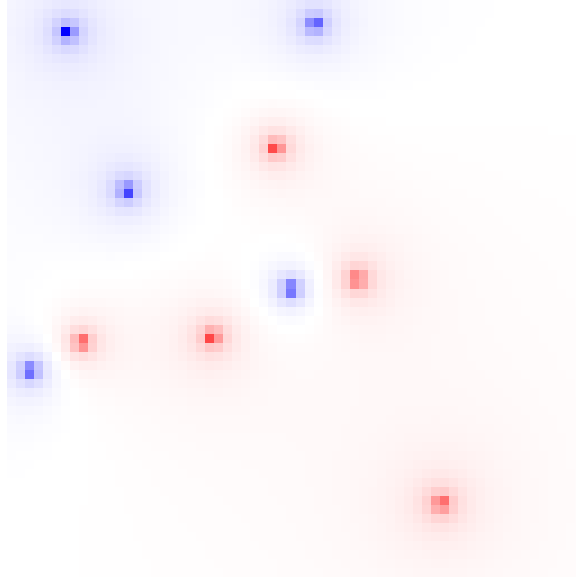Figure 1: Code to downsize an image, using OpenCV.

Figure 2: Bitmap image used as input to the Marching Squares algorithm. Image size is 64x64. Colour falls of with distance.
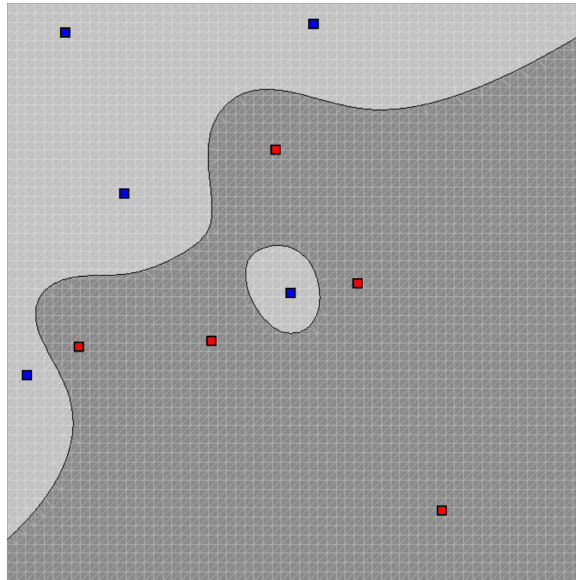

Figure 3: Nonlinear, radial, separation. Grid resolution is 64x64.
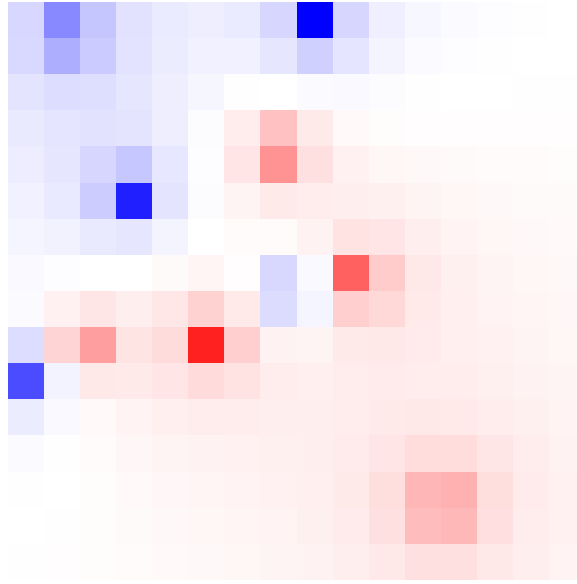
Figure 4: Bitmap image used as input to the Marching Squares algorithm. Image size is 16x16.
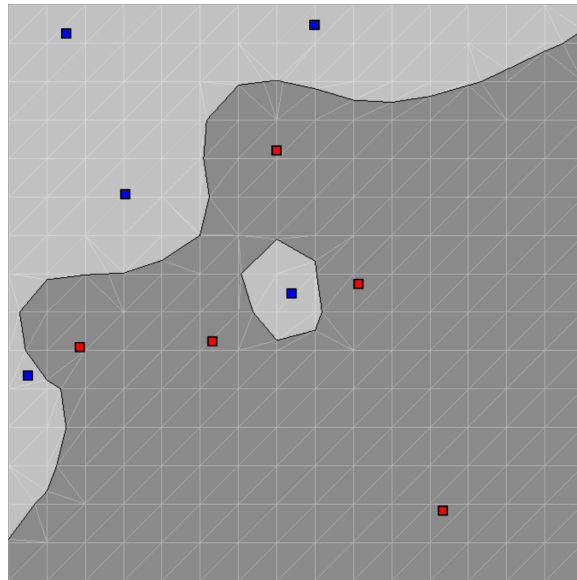

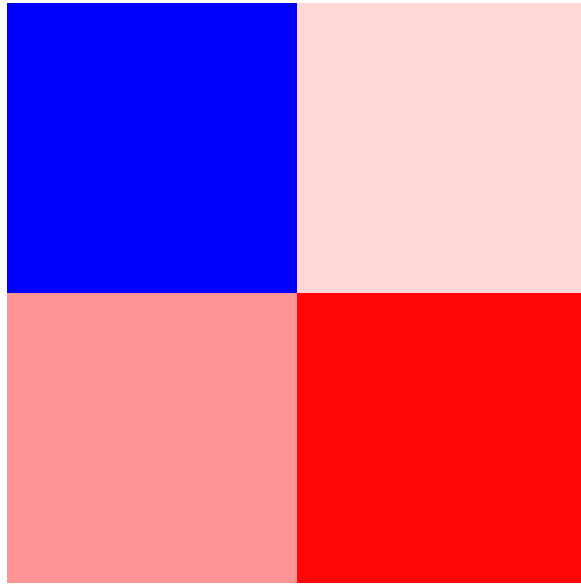Figure 5: Nonlinear, radial, separation. Grid resolution is 16x16.

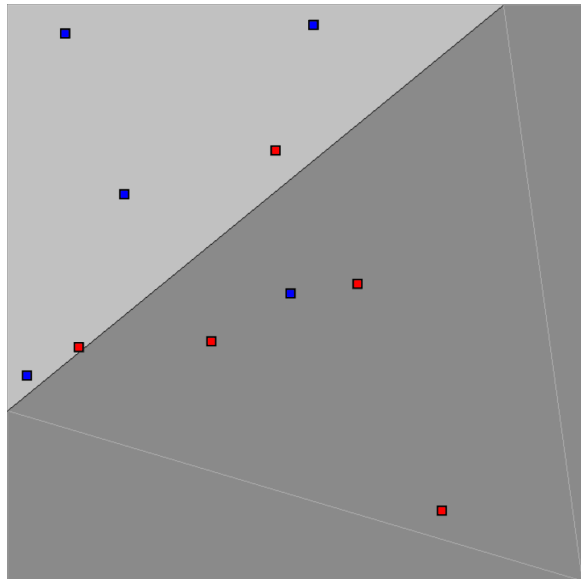Figure 6: Bitmap image used as input to the Marching Squares algorithm. Image size is 2x2.

Figure 7: Linear separation. Grid resolution is 2x2.