영상처리 실제 9주차 실습_컬러영상처리

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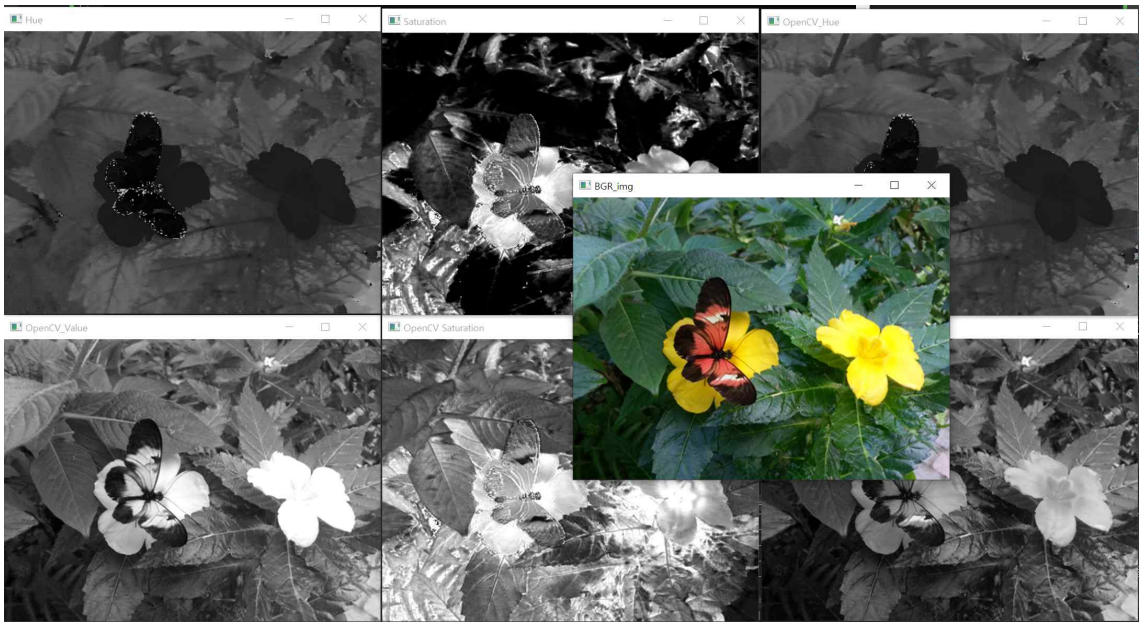
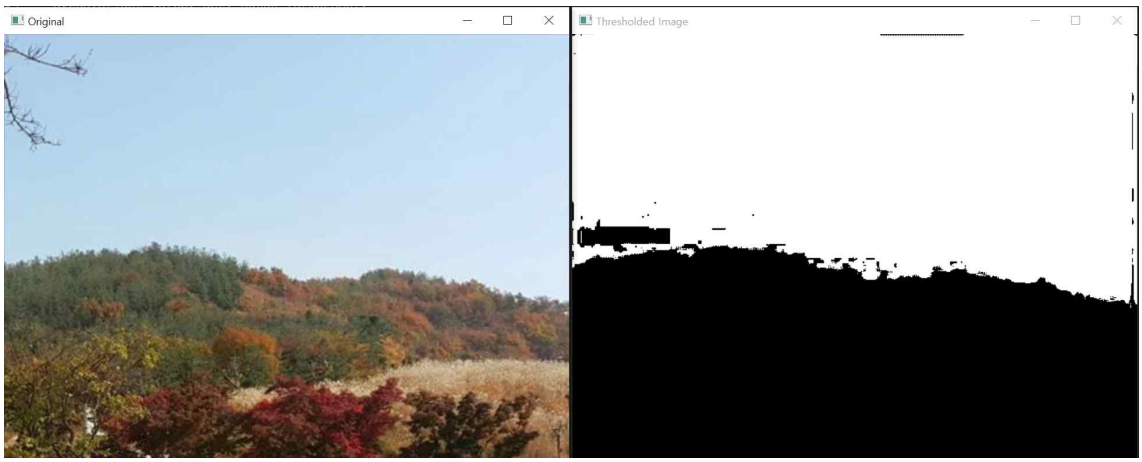
```
#include <opencv2/opencv.hpp>

using namespace std;
using namespace cv;

void bgr2hsi(Mat img, Mat& hsv)
{
	Mat hsi = Mat(img.size(), CV_32FC3);
	for (int i = 0; i < img.rows; i++)
	{
		for (int j = 0; j < img.cols; j++)
		{
			float B = img.at<Vec3b>(i, j)[0];
			float G = img.at<Vec3b>(i, j)[1];
			float R = img.at<Vec3b>(i, j)[2];

				float s = 1 - 3 * min(R, min(G, B) / (R + B + G));
			float v = (R + G + B) / 3.0f;

			float tmp1 = ((R - G) + (R - B)) * 0.5f;
			float tmp2 = sqrt((R - G) * (R - B) + (G - B) * (G - B));
			float angle = acos(tmp1 / tmp2) * (180.f / CV_PI);
			float h = (B <= G) ? angle : 360 - angle;
			hsi.at<Vec3f>(i, j) = Vec3f(h / 2, s * 255, v);
		}
	}

	hsi.convertTo(hsv, CV_8U);
}


void page16()
{
	Mat BGR_img = imread("./color_space.jpg", IMREAD_COLOR);
	CV_Assert(BGR_img.data);
	Mat HSI_img, HSV_img, hsi[3], hsv[3];

	bgr2hsi(BGR_img, HSI_img);
	cvtColor(BGR_img, HSV_img, CV_BGR2HSV);
	split(HSI_img, hsi);
	split(HSV_img, hsv);

	imshow("BGR_img", BGR_img);
	imshow("Hue", hsi[0]);
	imshow("Saturation", hsi[1]);
	imshow("Intensity", hsi[2]);
	imshow("OpenCV_Hue", hsv[0]);
	imshow("OpenCV Saturation", hsv[1]);
	imshow("OpenCV_Value", hsv[2]);
	waitKey();
}

int page21()
{
	Mat img = imread("./image1.jpg", IMREAD_COLOR);
	if (img.empty()) { return -1; }
	Mat imgHSV;
	cvtColor(img, imgHSV, COLOR_BGR2HSV);
	Mat imgThresholded;
	inRange(imgHSV, Scalar(100, 0, 0), Scalar(120, 255, 255), imgThresholded);
	imshow("Thresholded Image", imgThresholded);
	imshow("Original", img);
	waitKey(0);
```

```
	return 0;
}

int page22()
{
	VideoCapture cap("./tennis_ball.mp4");
	if (!cap.isOpened())
		return -1;
	for (;;)
	{
		Mat imgHSV;
		Mat frame;
		cap >> frame;
		cvtColor(frame, imgHSV, COLOR_BGR2HSV);
		Mat imgThresholded;
		inRange(imgHSV, Scalar(30, 10, 10), Scalar(38, 255, 255),
imgThresholded);
		imshow("frame", frame);
		imshow("dst", imgThresholded);
		if (waitKey(30) >= 0) break;
	}

	waitKey(0);
	return 0;
}

int page27()
{
	Mat src = imread("./pepper.bmp", IMREAD_COLOR);

	if (src.empty())
	{
		cerr << "Image load failed" << endl;
		return -1;
	}

	Mat src_ycrcb;
	cvtColor(src, src_ycrcb, COLOR_BGR2YCrCb);

	vector<Mat> ycrcv_planes;
	split(src_ycrcb, ycrcv_planes);

	equalizeHist(ycrcv_planes[0], ycrcv_planes[0]);

	Mat dst_ycrcb;
	merge(ycrcv_planes, dst_ycrcb);

	Mat dst;
	cvtColor(dst_ycrcb, dst, COLOR_YCrCb2BGR);

	imshow("src", src);
	imshow("dst", dst);

	waitKey();

	return 0;
}

int main()
{
	page16();
	page21();
	page22();
	page27();

	return 0;
}
```

결과화면



<page16 결과화면>



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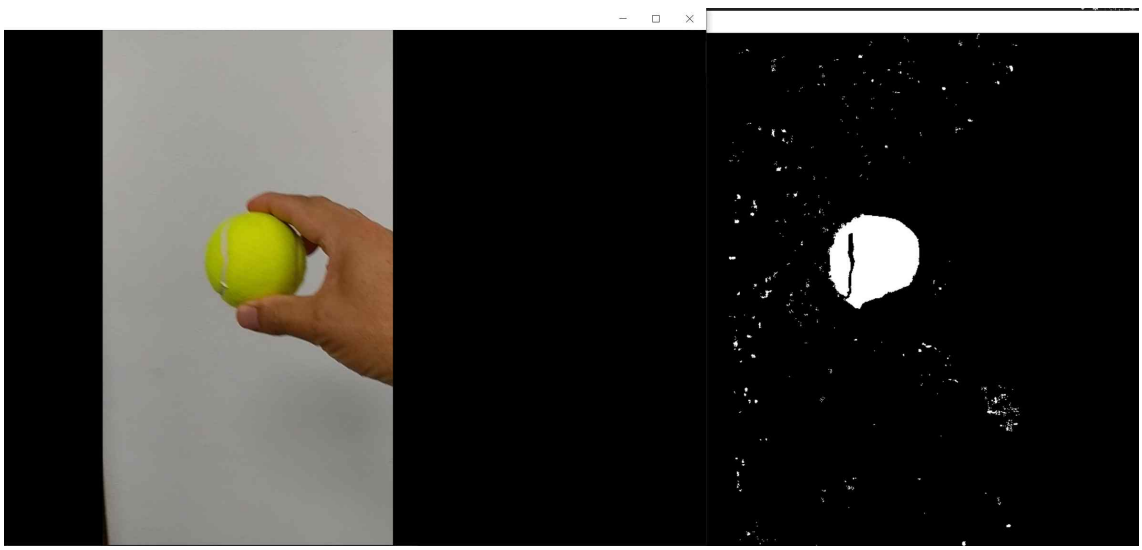

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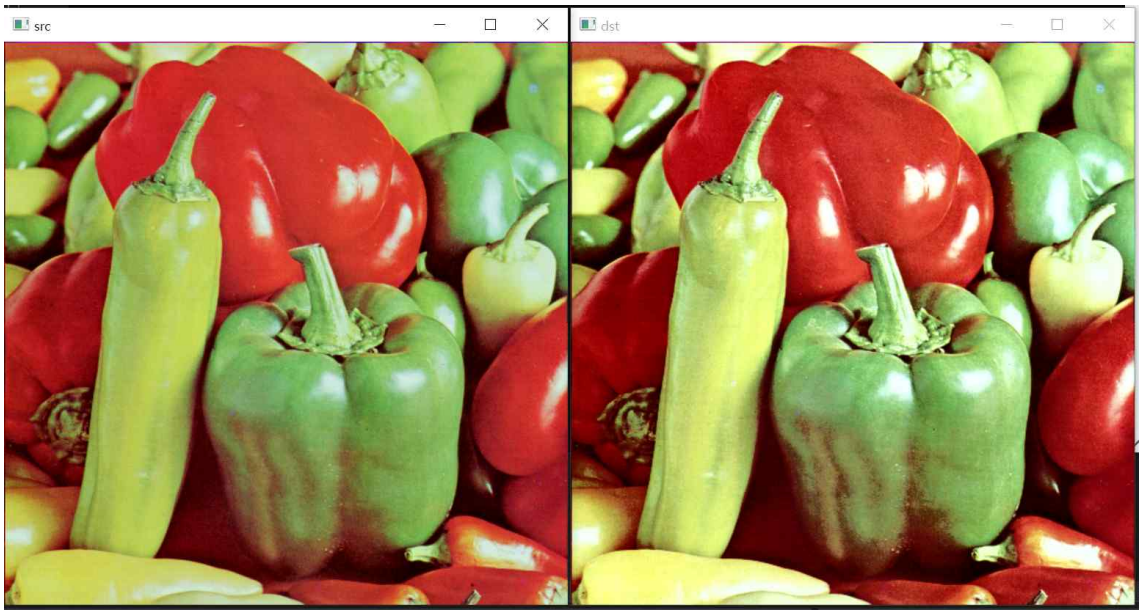

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