

OpenCV Tutorial C++

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Rotate Image & Video

Rotate Image

Rotating images by a given angle is a common image processing task. Although it seems little bit complicated, OpenCV provides some built-in functions making it easy to do it. Here is a simple OpenCV C++ example code to rotate an image. Here I use a track bar to change the rotating angle dynamically.

```

////////////////////////////////////
#include "opencv2/highgui/highgui.hpp"
#include "opencv2/imgproc/imgproc.hpp"

using namespace cv;

int main( int argc, char** argv )
{
    // Load the image
    Mat imgOriginal = imread( "MyPic.JPG", 1 );

    //show the original image
    const char* pzOriginalImage = "Original Image";
    namedWindow( pzOriginalImage, CV_WINDOW_AUTOSIZE );
    imshow( pzOriginalImage, imgOriginal );

    const char* pzRotatedImage = "Rotated Image";
    namedWindow( pzRotatedImage, CV_WINDOW_AUTOSIZE );

    int iAngle = 180;
    createTrackbar("Angle", pzRotatedImage, &iAngle, 360);

    int ilmageHieght = imgOriginal.rows / 2;
    int ilmageWidth = imgOriginal.cols / 2;

    while (true)
    {
        Mat matRotation = getRotationMatrix2D( Point(ilmageWidth, ilmageHieght), (iAngle - 180), 1 );

        // Rotate the image
        Mat imgRotated;
        warpAffine( imgOriginal, imgRotated, matRotation, imgOriginal.size() );

        imshow( pzRotatedImage, imgRotated );

        int iRet = waitKey(30);
        if ( iRet == 27 )
        {
            break;
        }
    }

    return 0;
}
////////////////////////////////////
You can download this visual C++ project from here.

```

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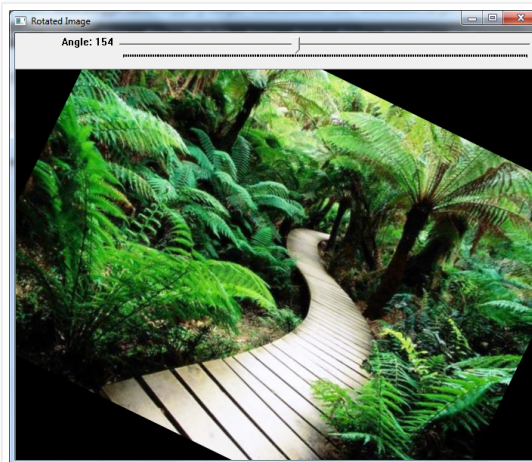
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Original Image



Rotated Image

Explanation

Here is the explanation for new OpenCV functions which are not found in previous lessons.

- **Mat getRotationMatrix2D(Point2f center, double angle, double scale)**

This function returns 2x3 affine transformation matrix for the 2D rotation.

Arguments -

- **center** - The center of the rotation of the the source image.
- **angle** - Angle of rotation in degrees (Positive values for counter-clockwise direction and negative values for clockwise rotation)
- **scale** - The scaling factor of the image. (Scaling factor of 1 means its original size)

Try different values for **center**, **angle** and **scale** and observe the output image.

- **void warpAffine(InputArray src, OutputArray dst, InputArray M, Size dsize, int flags = INTER_LINEAR, int bordreMode=BORDER_CONSTANT, const Scalar& borderValue=Scalar())**

This OpenCV function applies [affine transformation](#) to an image.

Arguments -

- **src** - Source Image
- **dst** - Destination image which should have the same type as the source image(The transformed image is stored in this location)
- **M** - 2x3 affine transformation matrix

- **dsize** - Size of the destination image
- **flags** - Interpolation methods
- **borderMode** - pixel extrapolation method. (Try these values; BORDER_REPLICATE, BORDER_CONSTANT, BORDER_REFLECT, BORDER_WRAP, BORDER_REFLECT_101, BORDER_TRANSPARENT and BORDER_ISOLATED)
- **borderValue** - If you use BORDER_CONSTANT for **borderMode**, this argument define the value used for the border

Another OpenCV Example to Rotate an Image

Here is another way to rotate an image. Here I use a callback function to apply the rotation instead of using a infinite while loop. Other than the rotation, you can change the scale of the image and border extrapolation method dynamically.

Here is the OpenCV C++ code.

```

////////////////////////////////////
#include "opencv2/highgui/highgui.hpp"
#include "opencv2/imgproc/imgproc.hpp"

using namespace cv;

int iAngle = 180;
int iScale = 50;
int iBorderMode = 0;
Mat imgOriginal ;
int ilmageCenterY = 0;
int ilmageCenterX = 0;
const char* pzRotatedImage = "Rotated Image";

void CallbackForTrackBar(int, void*)
{
    Mat matRotation = getRotationMatrix2D( Point( ilmageCenterX, ilmageCenterY ), (iAngle - 180), iScale / 50.0 );

    // Rotate the image
    Mat imgRotated;
    warpAffine( imgOriginal, imgRotated, matRotation, imgOriginal.size(), INTER_LINEAR, iBorderMode, Scalar() );

    imshow( pzRotatedImage, imgRotated );
}

int main( int argc, char** argv )
{
    // Load the image
    imgOriginal = imread( "MyPic.JPG", 1 );

    ilmageCenterY = imgOriginal.rows / 2;
    ilmageCenterX = imgOriginal.cols / 2;

    //show the original image
    const char* pzOriginalImage = "Original Image";
    namedWindow( pzOriginalImage, CV_WINDOW_AUTOSIZE );
    imshow( pzOriginalImage, imgOriginal );

    //create the "Rotated Image" window and 3 trackbars in it
    namedWindow( pzRotatedImage, CV_WINDOW_AUTOSIZE );
    createTrackbar( "Angle", pzRotatedImage, &iAngle, 360, CallbackForTrackBar );
    createTrackbar( "Scale", pzRotatedImage, &iScale, 100, CallbackForTrackBar );
    createTrackbar( "Border Mode", pzRotatedImage, &iBorderMode, 5, CallbackForTrackBar );

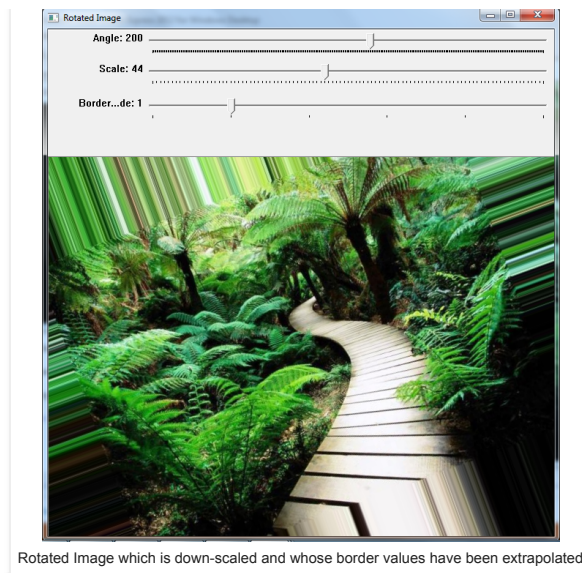
    int iDummy = 0;

    CallbackForTrackBar(iDummy, &iDummy);

    waitKey(0);

    return 0;
}
////////////////////////////////////
You can download this visual C++ project from here.

```



All the OpenCV functions have been discussed previously.

Rotate a Video

Rotating a video is also simple. The code is just like the 1st example in this lesson. Here is the OpenCV C++ code.

```

/////////////////////////////////////////////////////////////////
#include "opencv2/highgui/highgui.hpp"
#include "opencv2/imgproc/imgproc.hpp"
#include <iostream>

using namespace cv;
using namespace std;

int main(int argc, char* argv[])
{
    // open the video file for reading
    VideoCapture cap("C:/Users/SHERMAL/Desktop/MyVideo.mp4");

    // if not success, exit program
    if ( !cap.isOpened() )
    {
        cout << "Cannot open the video file" << endl;
        return -1;
    }

    const char* pzOriginalWindowName = "Original Video";
    namedWindow(pzOriginalWindowName, CV_WINDOW_AUTOSIZE);

    const char* pzRotatingWindowName = "Rotated Video";
    namedWindow( pzRotatingWindowName, CV_WINDOW_AUTOSIZE );

    int iAngle = 180;
    createTrackbar("Angle", pzRotatingWindowName, &iAngle, 360);

    while (true)
    {
        Mat matOriginalFrame;

        // read a new frame from video
        bool bSuccess = cap.read(matOriginalFrame);

        //if not success, break loop
        if (!bSuccess)
        {
            cout << "Cannot read the frame from video file" << endl;
            break;
        }

        imshow(pzOriginalWindowName, matOriginalFrame);

        //get the affine transformation matrix
        Mat matRotation = getRotationMatrix2D( Point(matOriginalFrame.cols / 2, matOriginalFrame.rows / 2), (iAngle - 180), 1 );

        // Rotate the image
    }

```

```
Mat matRotatedFrame;
warpAffine( matOriginalFrame, matRotatedFrame, matRotation, matOriginalFrame.size() );

imshow( pzRotatingWindowName, matRotatedFrame );

//wait for 'esc' key press for 30 ms. If 'esc' key is pressed, break loop
if (waitKey(30) == 27)
{
    cout << "esc key is pressed by user" << endl;
    break;
}
}

return 0;
}
```

////////////////////////////////////
You can download this visual C++ project from [here](#).

All the OpenCV functions, found in the above example have been discussed earlier.

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Previous Tutorial : How to Detect Mouse Clicks and Moves

Posted by Shermal Fernando



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Anonymous April 24, 2012 at 4:41 PM

hey dude...tnx for the tutorial...xD

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Anonymous September 13, 2012 at 4:04 PM

Thanks, tutorial really useful !

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Anonymous November 14, 2012 at 10:34 PM

awesome tutorials.....thanks a lot.

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THANX ALOT

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Seereen Noorwali May 10, 2013 at 12:55 AM

Thanks a lot for this nice code

can you add tutorial how to remove the blank area after rotate the image ?

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sisila priyankara August 17, 2013 at 11:36 AM

thank you bro....!

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Dejan Gope August 28, 2013 at 1:42 AM