Project Requirement and Specification

on

Image Processing

(CSE III Semester Winter Boot Camp project)
2020-2021

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CSE-ML-III-Sem

Problem Statement: Design a program using opencv and C++ to input an image and an angle from the user and print the rotated image through the given angle.

About the Project:

This project can be considered as an application of Image Processing. It enables us to learn the basics of image processing and opencv library. So it is a whole new learning experience as we will learn about the many functions available in opencv.

The project is all about taking an image as an input from the user and rotate it through an angle where the angle is also taken as an input by the user. We have visualized how an image pixels can be converted into a matrix using an inbuilt function which is easier to rotate. The process of rotation can be performed by using an inbuilt function which can be used to calculate an affine matrix of 2D-rotation or it can also be done by using the matrix rotation algorithm. Then the rotated image can be displayed by using an inbuilt function “imshow()”.

Technologies used in the Project:

To execute this project, we need Visual Studio or any other IDE that could support opencv and C++. Along with this we also need to install opencv latest version. After installing opencv, extract the exe files which will result in other folder named as “opencv”. The next step is to add its path to environment variable of the properties of our pc, the path that has to be copied is **C:\Users\user\Downloads\opencv\build\x64\vc15\bin** (it depends on the folder you store opencv folder). Then we have to set-up Visual Studio for C++ programming for which we have to install “**Desktop Development with C++**”. After installing, create a new project and change the debugger configuration to x64. Add a new item in visual C++ file with any name and cpp extension. Then we have to make some changes in project properties so as to set it for opencv and it can be done by following below steps:

- ✓ VC++ Directories ->Edit Include Directory -> copy the path of include from opencv folder and paste it
- ✓ VC++ Directories-> Edit Library Directory -> copy the path of lib in vc15 folder of opencv folder and paste it
- ✓ Linker-> Input -> Edit Additional Dependencies->copy the path of object file library in lib folder of opencv folder and paste it

Now the system is ready to execute any program in opencv. We will write the program according to the problem statement and then save it to see if there are any syntax errors. Then to run the program finally, click on “Local Windows Debugger”. And the corresponding output will be displayed.

Requirements of project:

Software Requirement: Visual Studio 2019, opencv-4.5.0

Hardware Requirement: 215MB for downloading opencv, 1376KB for downloading vs installer, 1.97 GB for downloading Desktop development with C++

Functions created:

Mat rotate(Mat image, double angle): I have created this “rotate” function to accept the image and angle as its parameter and return the rotated image matrix. In this function, I created a matrix for storing rotated matrix and then by using in-built function “getRotationMatrix2D(center, angle, scale factor)” which takes center of matrix, angle and scale factor as its parameter and returns a rotated matrix. Then we have used warpAffine function to transform the source image using specified matrix. And lastly, it will just return the rotated image matrix.