

## ANALYSIS' PROCESSING OF DIGITAL IMAGE FOR DETECTING FACE PHOTO BY METHODE HAARCASCADE

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### ABSTRACT

*Along with the development of this era, in the computerization's era is so rapidly, there are many things or areas of life which grow up as well, both the area of technology and information. In the online admission, is needed to upload a photo of prospective students. To prevent an uploading which not corresponding with context and suitability of image resolution which uploaded, that's why, it's needed to detect a face for making face photo of prospective students who is really quality. Face detection on digital image which is done by method of haarcascade, which is able to detect area of face on the picture to get a result. The result of trial produces the size of cropping of face on the picture is many differences which corresponding with a picture which has tried. The writer is interested in making an application program by programming C++ dengan judul "ANALYSIS' PROCESSING OF CITRA DIGITAL FOR DETECTING FACE PHOTO BY METHODE HAARCASCADE" This application can be expected which implemented in Admission of new students) Unisba Balitar.*

**Keywords :** *Haarcascade, Detection Of Face, Image Processing.*

### 1. INTRODUCTION.

The development of processing on image processing holds an important role which in the processing is not only giving effects which becoming an image is morwartistic, however it must be able to repair a quality from image itself. Processing an image is really enough used in a daily activities, that's why, the picture will become more clear. Processing image is not without computer, in order to spur the company's computer for improving the quality of making a soft device for processing image.

Processing image is processing and analysis an image which involve a visual perception. This process has feature input data and information which shaped an image. The term of digital image processing is defined by processing if two-dimensional images with computer. In a broader definition, digital image processing is cuppinh all of two-dimensional data. digital image is real or complex line which is represented by certain bits. In general, the shape of digital image is rectangle or squares (on some

systems of image, there is a hexagonal well) which has certain width and height.

Facial recognition system (Face Recognition) has been applied by using many methods, examples: Method PCA, Method ICA, Method LDA, Method EP, Method EBGM, Method Kernel, Method 3-D Morphable model, Method 3-D Face Recognition, Method haar-cascade, Method Bayesian Framework, method canny, Method SVM, Method HMM. Some of the above methods, they will be tried to improve.

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Based on the background in the research of essay is about design of digital image processing (image processing) the writer formulates a problem. How to test, research and process a digital image to detect face photo in admission of new students in Islamic university Balitar Blitar.

## **2. METHODS**

### **A. Literature review**

There are some researches which related about researching of essay it's based on some researchings else which have been done before, there are Rahmat Budiman, Rita Magdalena, Purba Daru Kusuma (2008) image processing for system can "see" information which is in the system. One of improving an image processing is in the system of face recognition (face recognition). The problem which often appears on face recognition is the problem about differences amount of image training. To handle it used system kernel is like in method Kernel Direct Discriminant Analysis (KDDA). In this method, the mistake is hoped to detect a face which is differences amount a image to be able be minimalized. In the last duty is used algoritma KDDA by kernel polinomial. Facial recognition system that made efficient, so it can do fast (realtime). In this final duty is using Visual

Basic as media development system, while database of Microsoft Access is used as information of data base user. Processing is like an image cropping, grayscale, and saving in the format jpg, is doing embeddedly so, it doesn't need an image processing first. While to test with image training by difference amount to make accuracy 82,2% by distance condition and lighting which same as other image.

### **1) System**

Jogiyanto H.M (2000: 683)<sup>[2]</sup>, "System is something which there are two or more componen or subsystem which interecting for one purpose." While according to Nugroho (2004:1), system is a part of componen which interacting that the function is collecting, processing, saving dan distrubting information to back deciding of making up and supervisor within in organization.

### **2) Data collecting**

Data is from DATUM which is material or fact collectong used for the need for analysis, discussed, scientific presentation, or statistict test. aslooked like from the source, the datadevides become 2 groups, there are primer dan sekunder. So, every research must needa as data analysis. Source: [http://carapedia.Com/pengertian\\_definisi\\_data\\_menurut\\_para\\_ahli\\_info505.html](http://carapedia.Com/pengertian_definisi_data_menurut_para_ahli_info505.html) di akses tanggal 15 Juli 2014.

### **B. Processing of digital image**

Image is one of multimedia component which is an important role as visual information, because which is reach with information. literally, image is picture on the dwi matra shape (two dimentional). Mathematically image is picture on dwi matra shape (two dimentional) which made from analog picture two dimentional which contiuous becoming diskret picture to processs sampling.

Analog image is devided N-line and M colom, so it is becoming diskrit image. Accroing between line and colom are piksel. For example is picture or dot diskrit on the N line and M coloum are called by pixel [n,m].

### **C. Face Recognition**

Face detection can be looked as problem pattern classification which its input is entering image and can be decided output which is like class of cable from the image. In this case, there are two classes, there are face and non-face. Technics of introducing face which is done for this is using asumption very much that data's face which has a same as size and back ground which same as other. In the reality, this asumption is not always applying because the face can appear by manu size sand position in the image and background which are many versions. (face detection) is one of first step which really importany before being done (face recognition). Field of research related to face processing (face processing) is :

1. face recognition is comparing faces and enteris with a face database and finding the face that best matches the input image
2. face authentication is testing an authenticity, a face with face data that has been entered before
3. face localization is the detection of faces but assuming there is only one face in the image
4. face tracking is estimating the location of a face in the video in real time
5. facial expression recognition to recognize the condition of human's emotions.

### **1) The resolusi pixel**

There are three aspects that determine the quality of photo images, is, resolution, lens optics, and processor capabilities. The number of pixels the camera is listed is biodegradable or visible to the computer when purchased. The number of pixels affects the quality of the image. The larger the resolution, the more expensive it will cost. Nevertheless, there are other factors that determine the price. The latest camera is always followed by the addition of the number of resolutions. The latest output camera has a higher resolution than the previous output. Which have to know, resolution of camera DSLR, camera poket, or camera of

mobile phone, it's same. however, the size of sensors is not same. The size of dimention's piksel influences quality of photo as well.

Resolution is picture element which arranges in the digital picture. resolution is determined by amount and pisket collecting which is form in a picture. Quantity of points in the picture is very determine of the image quality. Piksel is the smallest image dimensional in the digital. Resolution is one of factor a determinants of quality of image digital. cause resolution is directly proportional with quality of image. the higher of the resolution, the better the of quality. otherwise, the lower of the resolution, the lower of the image quality. however, resolution is not only one determinants of quality, resolution of digital camera images is the maximum number of piksel multiplied wide.

for one mega piksel, amount of pixel in the photo area is one million pixel of bicubic. one million pixel can fill field area by order of 900 width contents and 1200 long sides by 3,4 rectangular ratio.

## **2) Open CV**

Open CV (Open Computer Vision) is and API (Application Programming Interface) Library which has been so familiar by computer vision image processing. Computer Vision is one of branch from knowledge field of Image Processing which possible the computer can be seeing like human. by that vision, computer can get decision, action, and knowing an object. some implementation from vision computers are Face Recognition, Face Detection, Face/Object Tracking, Road Tracking, dll. Open CV is library Open Source for Computer Vision for C/C++, OpenCV is disigned for aplication of real-time, has functions acquisition which is good for image/video.

## **3) Programming language**

Programming language C++ is programming computer which is made by (Bjarne Stroustrup) it's improving from C language that improved in Bell Labs (Dennis Ritchie) in around 1970, that language lowered from the previous language, it's BCL, in the first, it designed as programming

language which is operated on the Unix system, on its development, ANSI version (American National Standard Institute) programming language C becoming dominant version, although the version is not often used on improving system and network for embedded, Bjarne Stroustrup system as well on Bell Labs, in the first time for improving C++ in the 1980, to back up future on C++, it's build efficiency and support system for low level coding. On the C++ is added the new concepts like class by the charactersn like inheritance and overloading. One of basic differences with C language is supporting with Object Oriented Programming). The differences between programming language C and C++ although the languages is using di tax of the same but they have the differences, C is prosedur of programming language, solving a problem is used by deviding the problem in the subproblem which is smaller, C++ is programming language which has programming character oriented objek, for finishing a problem, C++ does the first step by explining classes which is small class made before as abstract from objects, Class contain with condition of object, the members and abilities from their object, after being Class used and the problem broken by class.

### 3. DISCUSSION

The application is designed by using library Open CV 2.4.10 to facilitate and speed up in the processing picture.by using library this app beome easy to implement.the following scenario is the design flow of program use in the manufacture of the application :



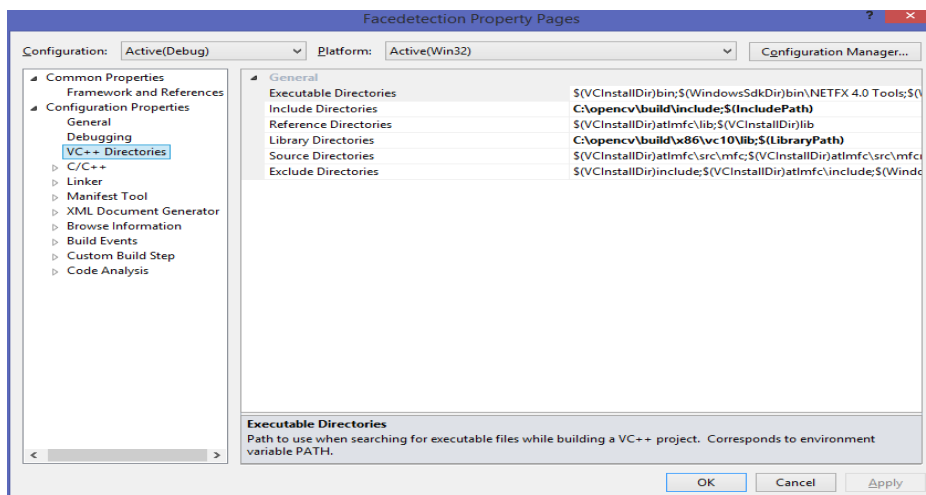
OpenCV 2.4.10

Ms. VS 2010

#### 3.1. Configuration Library OpenCV 2.4.10 on Ms. Visual Studio 2010

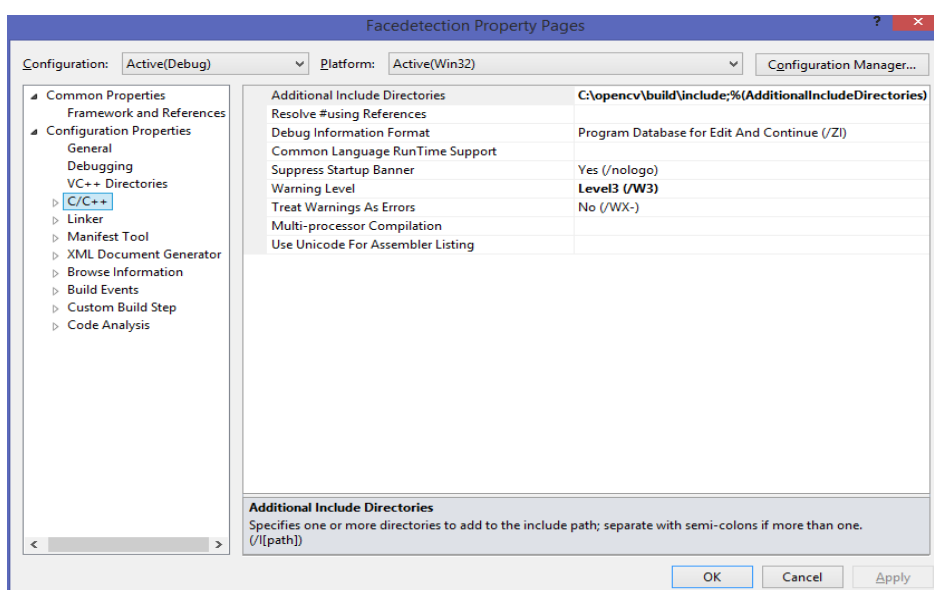
The following configuration of calling library OpenCV 2.4.10 on Microsoft Visual Studio 2010 :

1. Adding a configuration on VC++ directories to call library OpenCV and Include OpenCV generally. On this part is useful for calling directory library opencv which we have install in our PC. For calling library include, we type directory include which has been installed, for example on C:\opencv\build\include\ although for library which contain with files. C:\opencv\build\x86\vc10\lib\



Gambar 3.1 Konfigurasi Include dan library addition pada Microsoft Visual Studio 2010

2. Configuration calling include from directory OpenCV for the part of C/C++ we add directory includes like on the first configuration is C:\opencv\build\include\





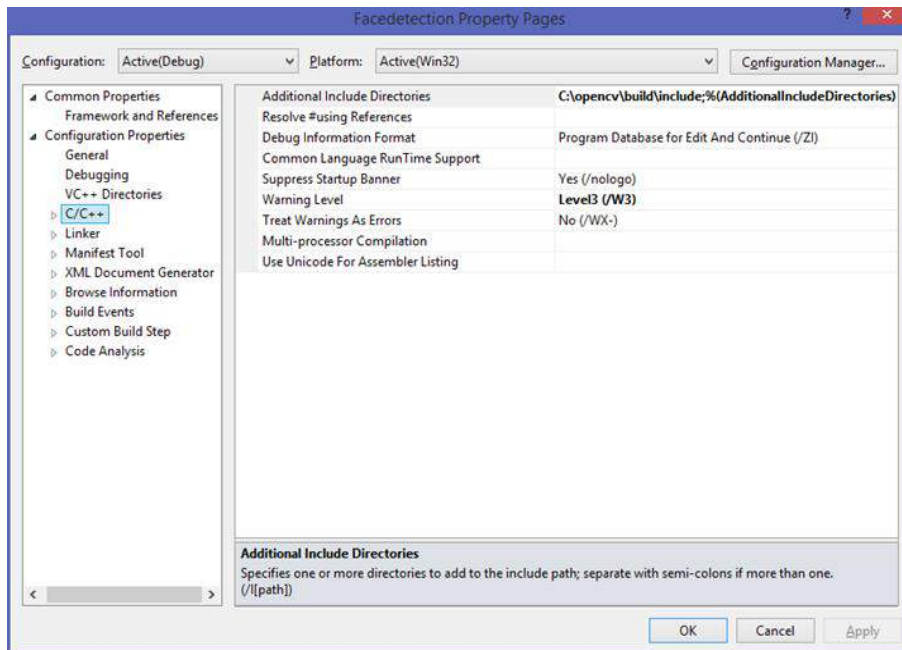


Image 3.2 Configuration include from directory OpenCV

3. Increase configuration library for linker to calling library from directory OpenCV To linker added location directory files for location “additional library directories” in `C:\opencv\build\x86\vc10\lib\`

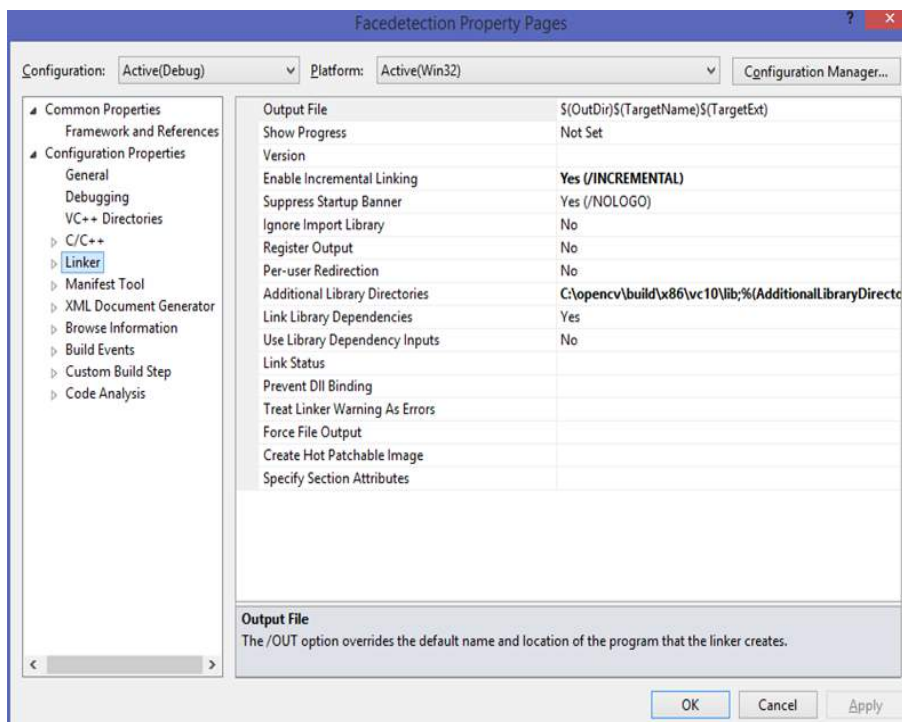


Image 3.3 Increasing library from directory OpenCV



4. Increase configuration library for linker to calling library from directory OpenCV. In this part, we fill the names of library which we used. The names of library available for directory whit we used. And then copy the name of library in "linker → input → additional dependencies". This is name of library can we used in application :

```
opencv_calib3d2410d.lib;opencv_contrib2410d.lib;opencv_core2410d.lib;opencv_features2d2410d.lib;opencv_flann2410d.lib;opencv_gpu2410d.lib;opencv_highgui2410d.lib;opencv_imgproc2410d.lib;opencv_legacy2410d.lib;opencv_ml2410d.lib;opencv_nonfree2410d.lib;opencv_objdetect2410d.lib;opencv_ocl2410d.lib;opencv_photo2410d.lib;opencv_stitching2410d.lib;opencv_superres2410d.lib;opencv_ts2410d.lib;opencv_video2410d.lib;opencv_videostab2410d.lib;%(AdditionalDependencies)
```

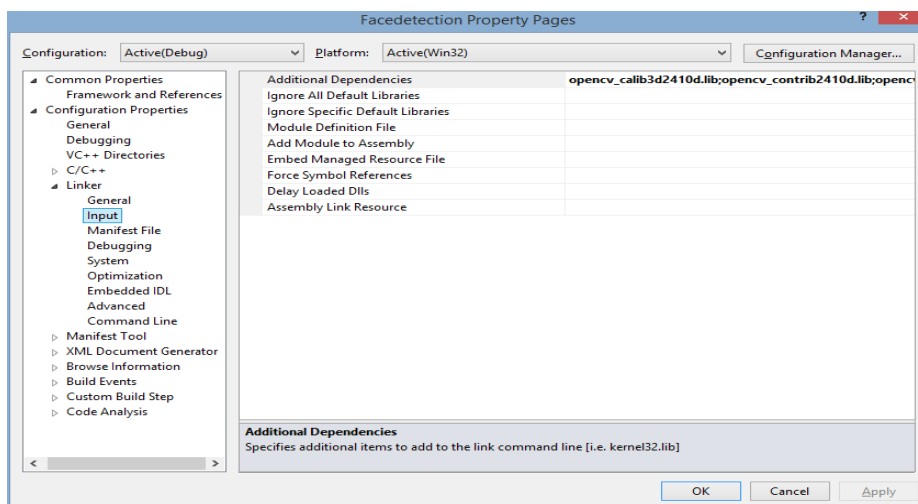
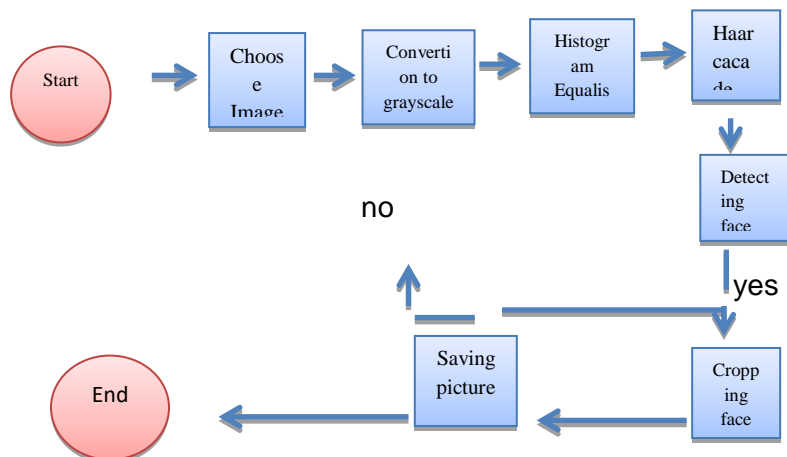


Image 3.4 Increasing library from directory OpenCV

### 3.2 Designing Process Using Flowchart

This is groove diagram for the program



## 4. CONCLUDING

### 4.1 Trial a program

This chapter will explaining about trial a program with types of picture. This program operated with specification hardware and software :

#### a. Hardware

1. Processor : Intel Pentium Core i3 (2.2 GHz)
2. Harddiks :Capacity Drive C:/242 GB free space 15GB
3. RAM : 8 GB free space 4 GB
4. VGA : Ati Radeon HD6730M 2GB

#### b. Software

1. Operation system : Windows 8.1 Proffetional 64 bit
2. Software build : Microsoft Visual Studio 2010, OpenCV 2.4.10

#### c. Analysis and Trial a program

### 4.2.1 The types trial picture

Trial picture landscape close up divided into several different resolution that is, about 400x300, 600x400, 800x600 and 1 type image portrait close up with 400x600 resolution.

result picture which trial can seen into page enclosure for detail result with cropping result, which saved into PC, and which displayed error result in image except face picture.

#### 4.2.1.1 Trial picture with 400x300 resolution

Analysis a trial picture :

1. from the ten pictures which trial, perfect face detected, or can said 100% accurate.
2. Resolution which got from face cropping, this picture is small about 49x49 until 99x99. Caused picture resolution, which trial is small too.
3. result face cropping is small resolution caused resolution scale is small too, so the result is small.

#### 4.2.1.2 Trial picture with 600x400 resolution

Analysis a trial picture :

1. from the ten pictures which trial, perfect face detected, or can said 100% accurate.
2. resolution result the face cropping which stored into harddisk about 72x72 until 148x148. result of cropping which stored in harddiks more bigger than 400x300 resolution.
3. result of face cropping is medium, caused resolution scale is standart.

#### 4.2.1.3 Trial picture with 800x600 resolution

Analysis a trial picture :

1. from the ten pictures which trial, perfect face detected, or can said 100% accurate. Although, detected result this picture which trial is false in image a and e but the result have small resolution is 43x43, 46x46, 59x59
2. resolution result face cropping which stored in harddisk about 95x95 until 197x197. the result cropping which stored in harddisk more bigger than 400x600 resolution.

#### 4.2.1.4 Trial portrait picture with 400x600 resolution

Analysis a trial picture :

1. from the ten pictures which trial, perfect face detected, or can said 100% accurate.although, detected result this picture which trial is false in image a,f,and g, but the result have small resolution is

44x44, 46x46, 51x51. besides which detected false have big resolution 119x119 at image g.

2. resolution result face cropping which stored in harddisk about 158x158 until 197x197. the result cropping which stored in harddisk more big than landscape picture 600x400 resolution and landscape resolution 800x600.

#### 4.2.1.5 analysis trial with landscape picture except for face images

while for images other than facial images is cars and monkeys generate program errors. this is because the library can't detect the face of the image.

#### 4.2.1.6 Analysis trial allow image

Based on the test of the illustration of the image, it can be concluded as follows :

1. the higher resolution of an image then the cropping of the face an image produces high resolution of the image stored on the hard disk. however, the higher resolution also the tested image makes more detail of the image, so it can cause the wrong detection even though it can always detect the face
2. the background of the image affects the results of face detection, which can lead to incorrect detection despite one of the proper detection on the face. examples that can be displayed in the images, b, c, d, h, l and j that have a background that looks plain.
3. the distance of the object retrieval of an image affects the result of cropping face resolution stored on the hard disk. the farther distance of the object retrieval the smaller resolution the same in the other image.
4. photos used should use close up portrait photos as well as official photos that have been commonly used. so the result of cropping face detected and stored on the hard disk higher resolution the resolution of the tested image is very influential on the results of cropping the face stored on the hard disk

5. difference in landscape and portrait photos also affect the results of facial cropping, so portrait photos produce higher resolution than landscape photos
6. the background of the tested image also affects the face detection of the image
7. the distance from capturing an image on an object affect the result of the resolution of the detected face cropping image. this can be seen in the image detail by using what camera and focal length of the camera

#### 4.2.2 Advantages and disadvantages of this study advantages :

1. the photo being tested can be any photo as long as the photo has a person's face though with a small resolution
2. can detect all faces with different expressions
3. the program run does not require long computing time because it uses the existing library

## 5. SUGGESTIONS

1. because the focus on the detection of a person's face for the detection of images other than the face of people, the program becomes an error. this is because there is no exception handling on the program as a warning if error
2. for the detection of faces on someone who is more leverage required background really plain. this leads to incorrect face detection of the image because it is based on features of the harcascade method
3. this program is only for a research that can only run on IDE C++ (for this program run by using IDE M Visual Studio 2010) that has not been compressed into a file installer that can run for the general public
4. for a resolution greater than 800x800 can not be displayed perfectly because the limitaions of the PC screen used is only reach 1368x768. so the results displayed on windows look truncated

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