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Multimedia Application Final Project

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Whoa!

We will introduce ourself and this project!!



Our team



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01

Application

Technologies about the functionalities

Dilatation & Erosion

cv::dilate(src, dst, kernel)
cv::erode(src, dst, kernel)

src - It represents the source(input) image.
dst - It represents the destination (output) image.
kernel - It represents the Kernel.

1. Removing Noise
2. Identify intensity bumps or holes in the picture.
3. Isolation of individual elements and joining disparate elements in image.

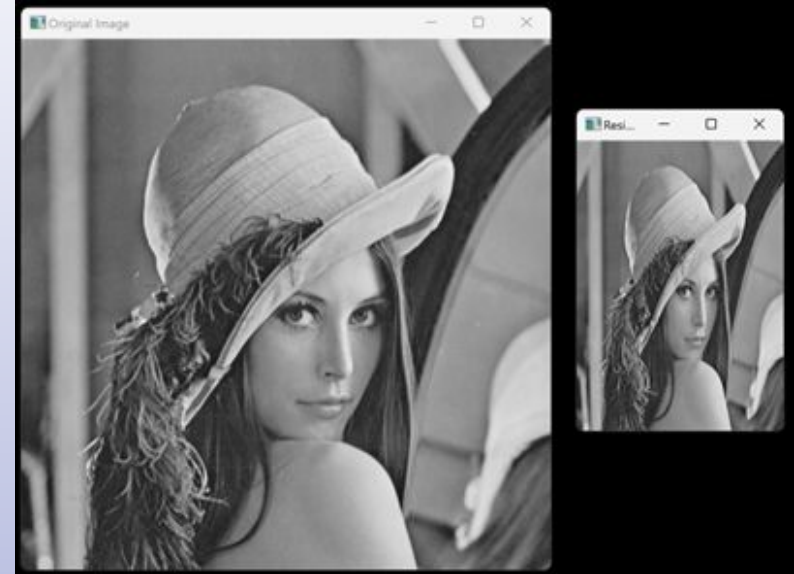


Resizing

- The main function: `cv::resize`
- The interpolation method: `INTER_LINEAR`

It takes as input:

- an image
- two dimensions



Result of resizing

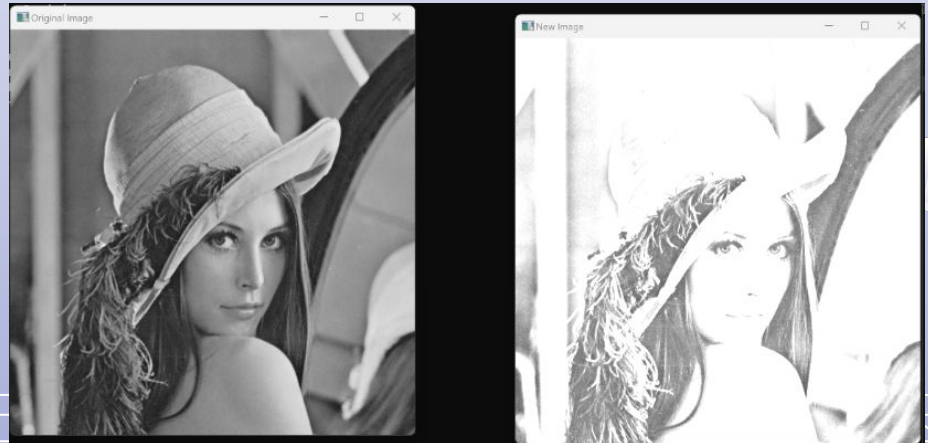
Lighten / Darken

- The mainly equation :

$$g(x,y) = \text{Alpha} * f(x,y) + \text{Beta}$$

Alpha -> factor to adjust the image contrast

Beta -> factor to adjust the image brightness



Panorama Stitching



What is it?

It combines overlapping images to create a wide-angle panoramic view.



Function

It utilizes the OpenCV library's `cv::Stitcher` class to perform the stitching operation.



Remark

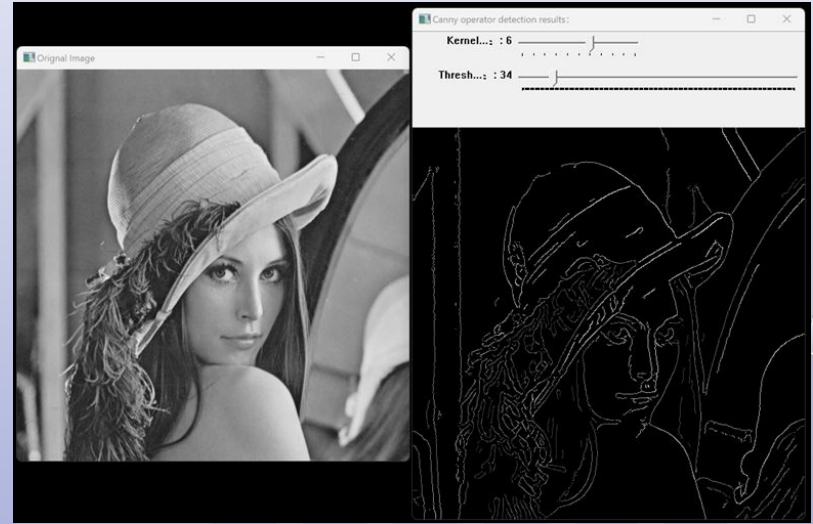
The images to be stitched must have sufficient overlap.

```
cv::glob(directoryPath, imageNames)
images.push_back(image)
cv::Stitcher::create()
stitcher->stitch(images, result)
cv::Stitcher::Status
```



Canny edge detection

1. Hysteresis threshold, noise reduction kernel value
2. 'callBackCanny' function
3. Gaussian filter
4. Edge detection: Canny operator
5. Extract the edge regions
6. Adjustable parameters



Interface



Technology — Qt

Qt is a cross-platform C++ application development framework that provides rich graphical interface tools and features that enable developers to easily create beautiful and intuitive user interfaces.

Qt GUI



QApplication → main function, the entrance of the whole program

QMenu

QAction

QLabel

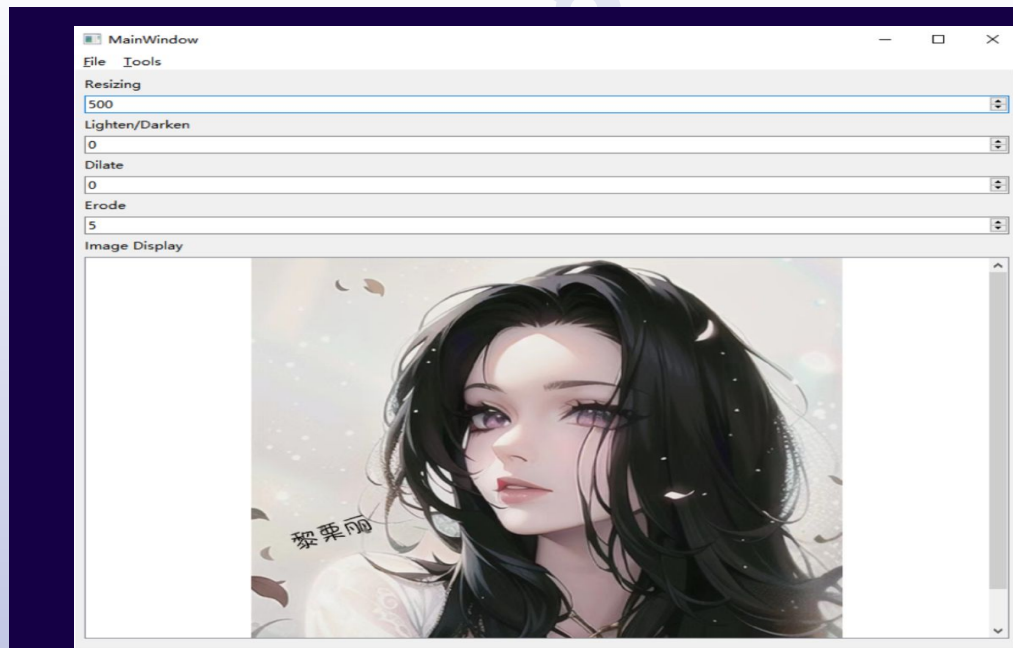
QSpinBox

connect() → Connecting MainWindow's functions and QT's components



Interface's Fonction

- Open a single image
- Open multiple images
- Save image
- Perform stitching function
- Perform Canny edge detection





02



Project management

Planning of this project



Project Management



Analyse Project



**Assignment of
tasks**



**Discussion and
exchange**



**Combined
results**

- Qianqiu and Shuyuan are responsible for the Resizing, Lighten / Darken and Canny algorithms.
- Qiyao and Yawen are mainly responsible for Panorama / Stitching, as well as the Erosion/Dilatation part.
- Yuze is mainly responsible for creating a user interface using Qt.





03

Project status

Functional coverage

Project status / functional coverage

Function to use in the project

dilatation / erosion

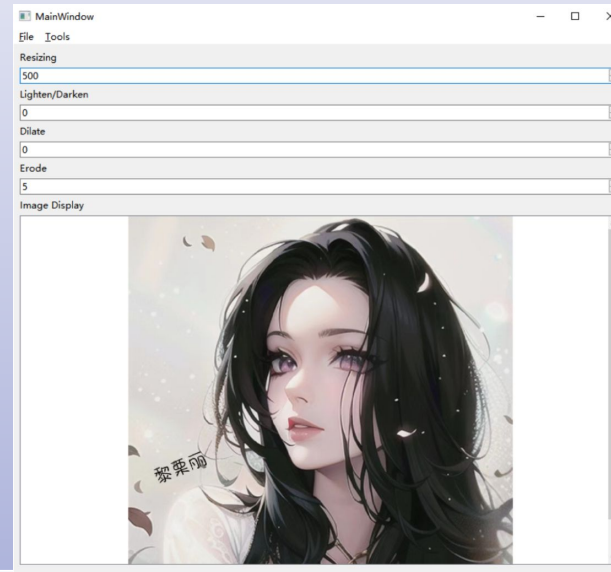
resizing

lighten / darken

panorama / stitching

Canny edge detection

Interface



Thanks!

Do you have any questions?





04

Demonstration

Let us show you our project