**HUBEI UNIVERSITY OF AUTOMOTIVE TECHNOLOGY**



**Python程序设计实训报告**

**课设题目： opencv图像处理程序设计**

**专 业： 计算机科学与技术（汽车智能化与信息化）**

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**成 绩：**

**完成日期: 2.23**

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## **1、课程设计目的与任务**

### 1.1实验目的

运用本学期课程的学习，使得学生能过熟练使用python开发环境，熟练运用python列表，元组，字典，集合等基本数据类型以及相关列表推导式，切片等特性来解决实际问题，熟练掌握python分支结构，循环结构，函数设计以及类的设计与使用，了解python程序的调试方法，熟练运用python编写面向对象程序，同时使我们自己了解那个领域的python扩展模块基本用法。

### 1.2实验要求

要求学生自己通过本学期对python的学习来来完成对特定程序的编写，并让其实现一定的功能，同时培养学生的分组合作的能力，培养学生自主学习的能力。

### 1.3实验题目

《Python语言设计实训》是一门实用性和实践性很强的课程，所以本课程的课程设计环节占有非常重要的地位。它是Python语言程序设计结束后的一门重要实践性课程，是为加强学生用程序设计的思想分析和解决问题的能力。我们选择的题目是opencv图像处理。处理信息的功能包括图像读取，图像显示，灰度变化，边缘提取，缩放，目标分割，裁剪等功能。

## **2、课程设计内容与要求**

### opencv图像处理

处理信息包括图像读取，图像显示，灰度变换，颜色变换，边缘提取、缩放、目标分割、裁剪等功能。

该系统需要能够提供下列功能：

（1）系统以菜单方式工作。（必做）

（2）读取文件夹图像（必做）。

（3）读取彩色图片（RGB格式）并转换成灰度图片（Gray格式）, 显示图片，保存到指定路径（必做）。

（4）读取彩色图片，对像素值进行反色处理（例如：（0，0，0）处理后变成（255，255，255））,显示图片，保存到指定路径（必做）。

（5）边缘提取，使用Canny算子提取图片边缘信息，显示图片，保存到指定路径（可选项）。

（6）图片大小变化，读取一张图片，缩小或者放大到指定尺寸，图片，保存到指定路径（必做）。

（7）目标分割，选择一张颜色对比明显的图片，设置合适的阈值，分割出图像中的特定颜色目标（可选项）。

（8）图片裁剪：指定像素大小裁剪出图片的一部分（必做）。

（9）使用pyqt实现功能界面（加分项）。

## **3、设计分析**

### 3.1程序简介

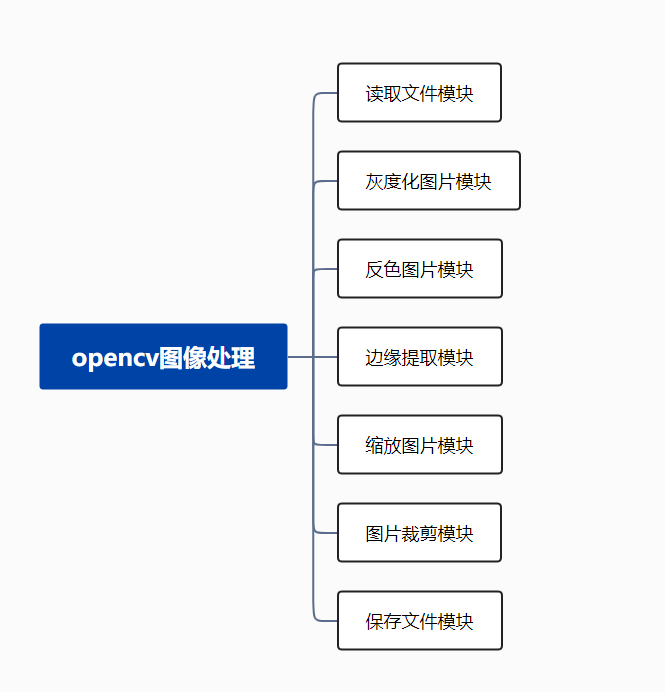
运用pycharm软件来当作python的开发环境。Opencv图像处理可以在pycharm安装opencv的库来进行操作。OpenCV-Python是一个Python绑定库，旨在解决计算机视觉问题。用pyqt来实现界面功能，PyQt6 是Digia的一套Qt6与python绑定的应用框架，PyQt6类分为很多模块，PyQt6类分为很多模块，但用来制作窗口界面的是QtGui 。QtGui包含了窗口系统、事件处理、2D图像、基本绘画、字体和 文字类。

用户界面(User Interface)是指对软件的人机交互、操作逻辑、界面美观的整体设计。好的UI设计不仅是让软件变得有个性有品味，还要让软件的操作变得舒适、简单、自由、充分体现软件的定位和特点。

用户界面（User Interface，简称 UI，亦称使用者界面[1]）是系统和用户之间进行交互和信息交换的媒介，它实现信息的内部形式与人类可以接受形式之间的转换。用户界面是介于用户与硬件而设计彼此之间交互沟通相关软件，目的在使得用户能够方便有效率地去操作硬件以达成双向之交互，完成所希望借助硬件完成之工作，用户界面定义广泛，包含了人机交互与图形用户接口，凡参与人类与机械的信息交流的领域都存在着用户界面。

### 3.2功能实现

系统各大模块如图2.2。



**图2.2系统功能结构图**

### 3.3整体思想

作为一个用户，呈现在用户面前的就是程序主界面。在程序主界面中，有各种功能可供用户选择。首先用户点击读取图片，从文件夹中读取一张.jpg.png格式的图片。然后再点击相应的模块按钮执行各种操作。

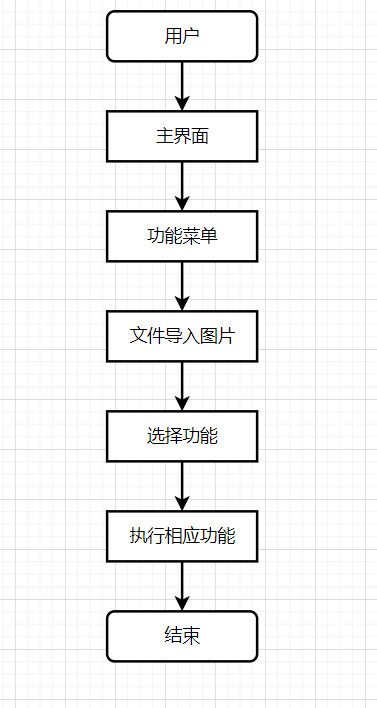
****

**图3.3.1用户图形界面**

## **4、总体设计**

### 4.1总体流程设计

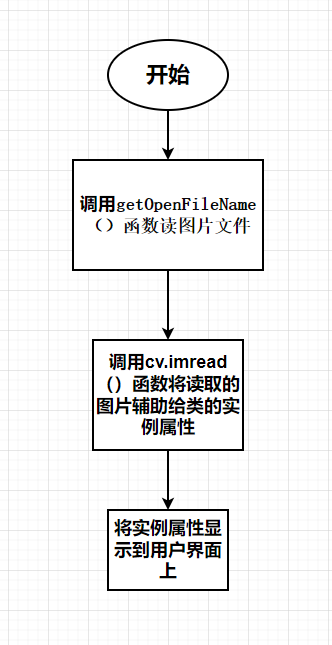
程序总流程如图4.1。



**图4.1主函数流程图**

### 4.2读取文件模块

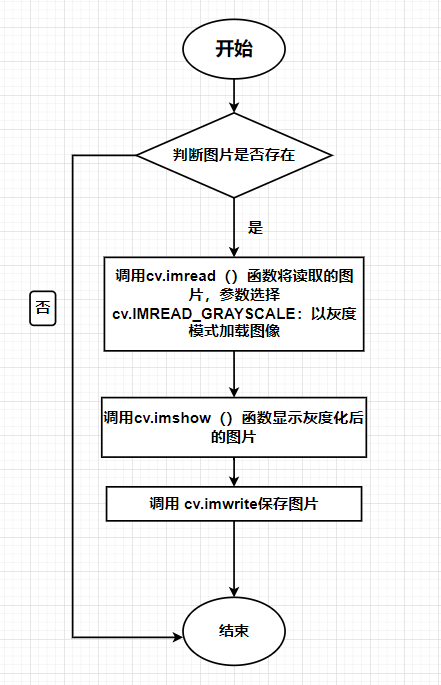
录入职工信息模块流程如图4.2。



**图4.2录入职工信息流程图**

### 4.3灰度化图片模块

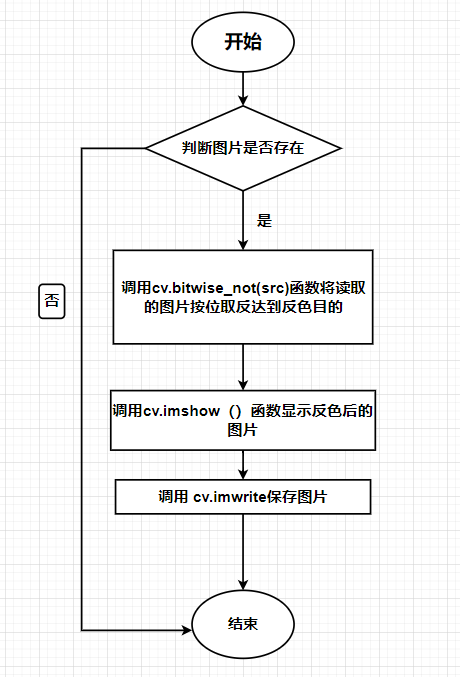
灰度化图片模块流程如图4.3。



**图4.3灰度化图片流程图**

### 4.4反色图片模块

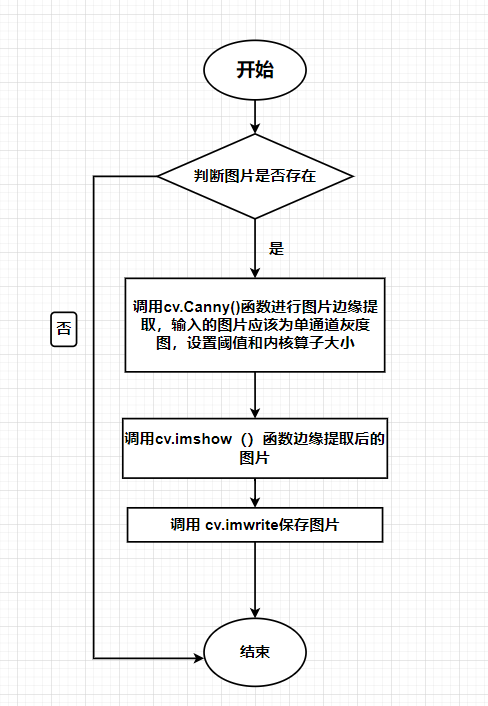
查找职工信息模块流程如图4.4。



**图4.4查找职工信息流程图**

### 4.5边缘提取模块

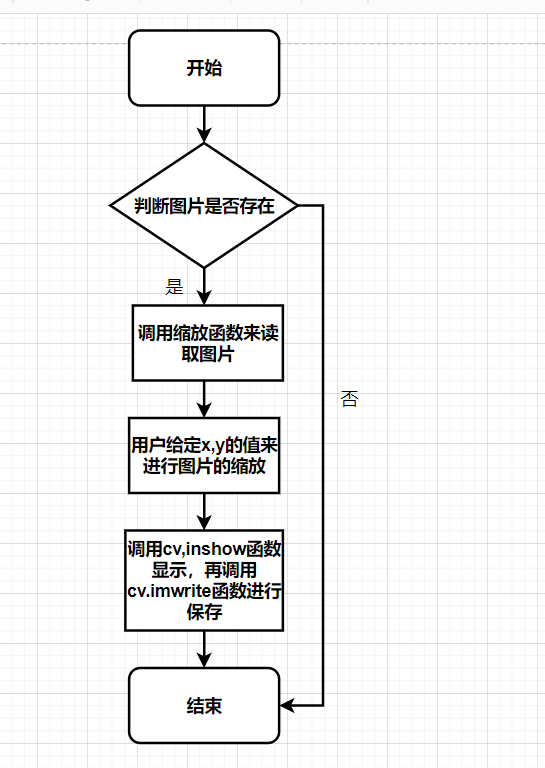
边缘提取流程如图4.5。



**图4.5边缘提取流程图**

### 4.6缩放图片模块

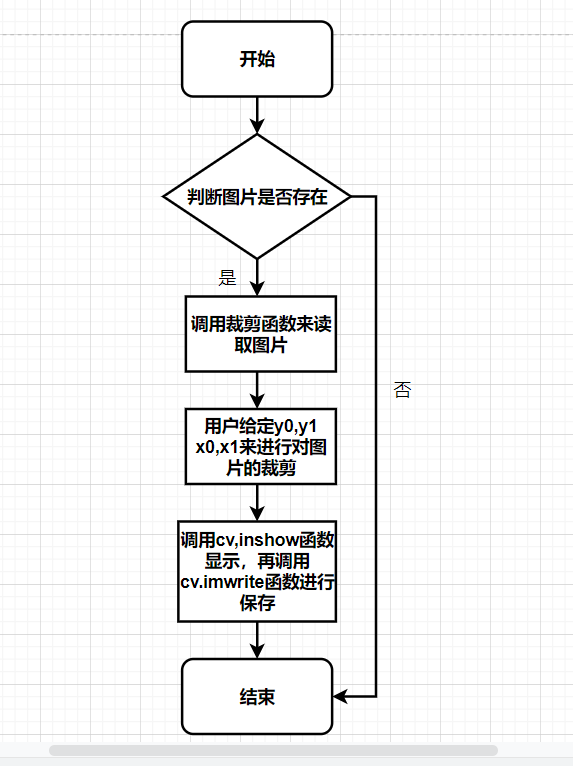
缩放图片模块流程如图4.6。



**图4.6缩放图片流程图**

### 4.7裁剪图片模块

裁剪图片模块流程如图4.7。

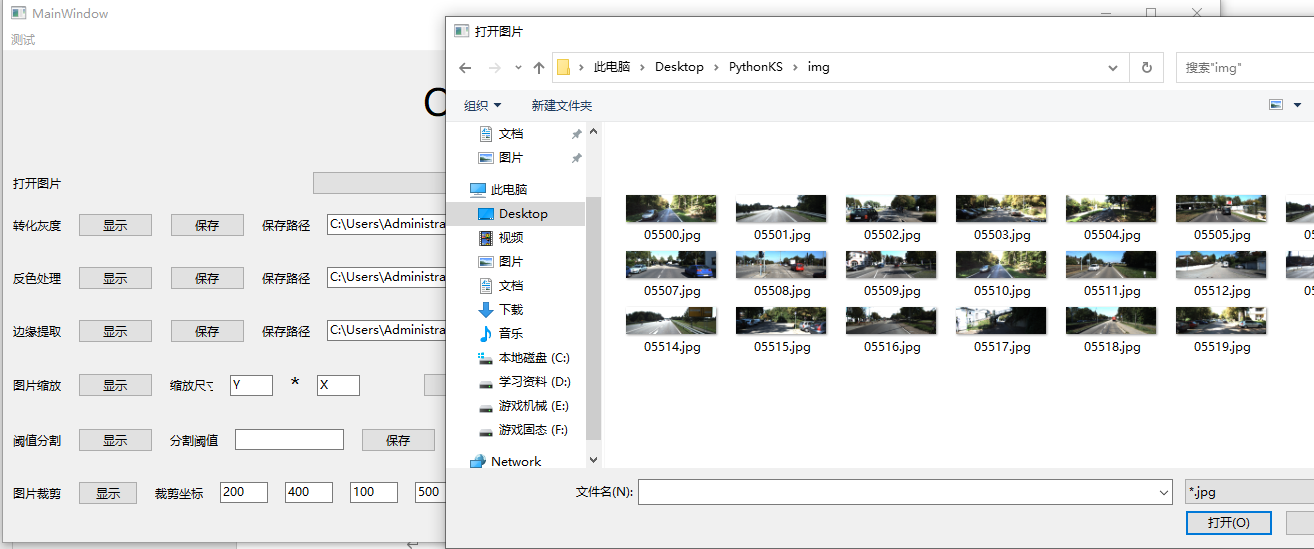


**图4.7裁剪图片流程图**

## 5、运行结果与功能测试



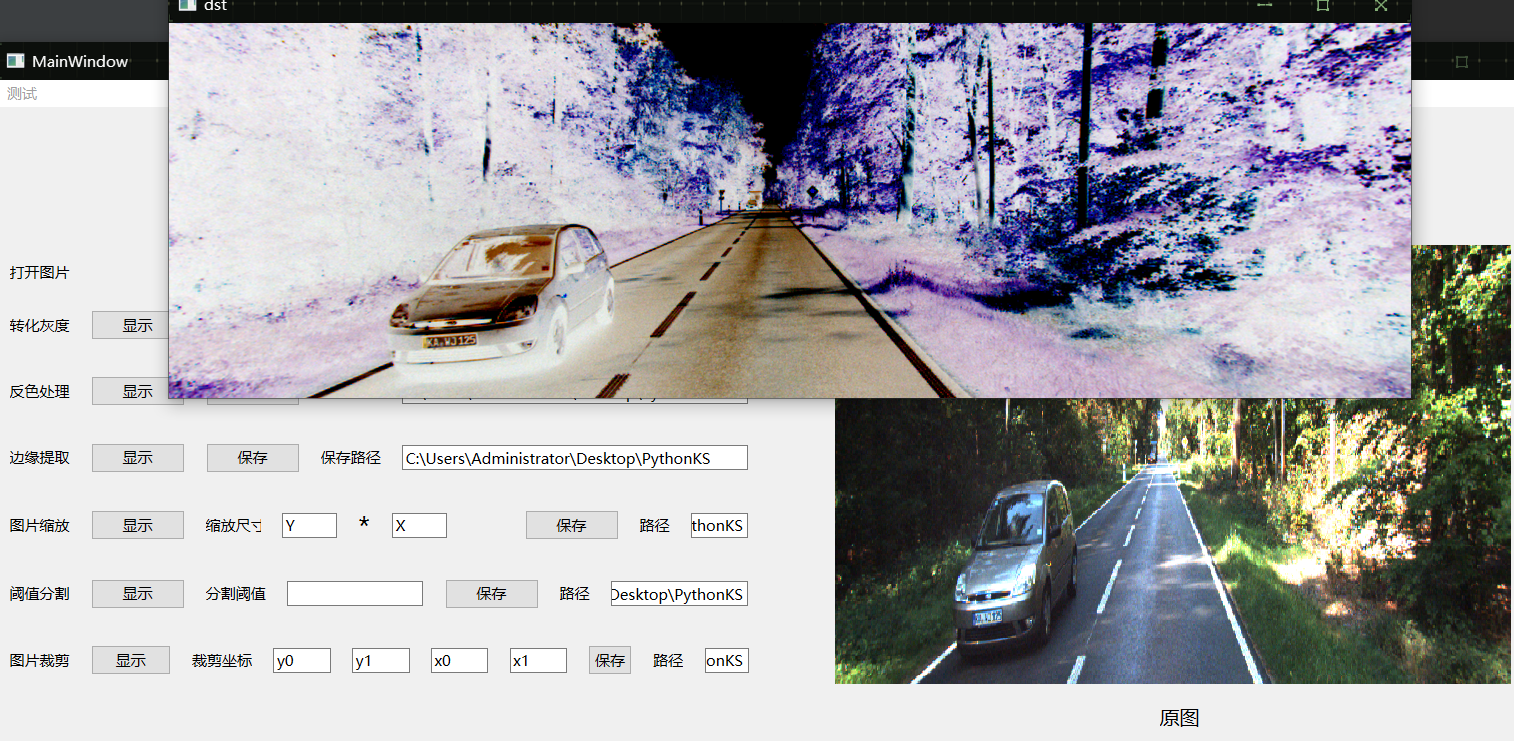
**图5.1主界面**



**图5.2读取文件夹图片**



**图5.3转化灰度**



**图5.4反色处理**



**图5.5边缘提取**



**图5.6图片缩放**



**图5.7图片裁剪**

## 6、源代码

Main.py

import sys

import cv2 as cv

import matplotlib.pyplot as plt

from PyQt6 import QtCore, QtGui, QtWidgets

from PyQt6.QtCore import \*

from PyQt6.QtGui import \*

from PyQt6.QtWidgets import QFileDialog, QMainWindow

import numpy as np

from mainForm import Ui\_MainWindow

class PyQtMainEntry(QMainWindow, Ui\_MainWindow):

def \_\_init\_\_(self):#初始化

super().\_\_init\_\_()

self.setupUi(self)

# def openimage(self):

# imgName, imgType = QFileDialog.getOpenFileName(self, "打开图片", "", "\*.jpg;;\*.png;;All Files(\*)")

# jpg = QtGui.QPixmap(imgName).scaled(self.label.width(), self.label.height())

# self.label.setPixmap(jpg)

def btnReadImage\_Clicked(self):#打开图片槽函数

filename, imgType = QFileDialog.getOpenFileName(self, "打开图片", "", "\*.jpg;;\*.png;;All Files(\*)")

self.captured = cv.imread(str(filename))

self.captured1=cv.imread(str(filename),0)

jpg = QtGui.QPixmap(filename).scaled(self.label\_b.width(), self.label\_b.height())

self.label\_b.setPixmap(jpg)

def btnReadImage\_Clicked1(self):

'''

从本地读取图片

'''

# 打开文件选取对话框

filename, \_ = QFileDialog.getOpenFileName(self, '打开图片')

if filename:

self.captured = cv.imread(str(filename))

# OpenCV图像以BGR通道存储，显示时需要从BGR转到RGB

self.captured = cv.cvtColor(self.captured, cv.COLOR\_BGR2RGB)

rows, cols, channels = self.captured.shape

bytesPerLine = channels \* cols

QImg = QImage(self.captured.data, cols, rows, bytesPerLine, QImage.Format\_RGB888)

self.label\_b.setPixmap(QPixmap.fromImage(QImg).scaled(

self.label\_b.size(), Qt.KeepAspectRatio, Qt.SmoothTransformation))

def btnGray\_Clicked(self):

'''

灰度化

'''

if not hasattr(self, "captured"):

return

self.gray=self.captured1

cv.imshow('dst',self.gray)

cv.waitKey(0)

cv.destroyAllWindows()

def btnSave1\_Clicked(self):

if not hasattr(self, "captured"):

return

cv.imwrite('gray.jpg',self.gray)

print('保存成功')

def btnFanse(self):#反色图片 速度快

src = self.captured

if src is None:

return

dst = cv.bitwise\_not(src) # 按位取反，白变黑，黑变白

self.fanse = dst

cv.imshow('dst', dst)

cv.waitKey()

def btnFanse1(self):#反色图片 速度慢

if not hasattr(self, "captured"):

return

cha = self.captured.shape

height, width, deep = cha

dst = np.zeros((height, width, 3), np.uint8)

for i in range(height): # 色彩反转

for j in range(width):

b, g, r = self.captured[i, j]

dst[i, j] = (255 - b, 255 - g, 255 - r)

self.fanse=dst

cv.imshow('dst', dst)

cv.waitKey()

def btnSave2\_Clicked(self):

if not hasattr(self, "captured"):

return

cv.imwrite('fanse.jpg',self.fanse)

print('保存成功')

def btnByjc(self):

# Canny边缘检测

byjc=self.captured

v1 = cv.Canny(byjc, 80, 150, (3, 3))

v2 = cv.Canny(byjc, 50, 100, (5, 5))

# np.vstack():在竖直方向上堆叠

# np.hstack():在水平方向上平铺堆叠

self.ret = np.hstack((v1,v2))

cv.imshow('img',self.ret)

cv.waitKey(0)

cv.destroyAllWindows()

# Canny边缘检测

def btnByjc1(self):

src = self.captured

# if src is None:

# return

blurred = cv.GaussianBlur(src, (3, 3), 0)

gray = cv.cvtColor(blurred, cv.COLOR\_BGR2GRAY)

grad\_x = cv.Sobel(gray, cv.CV\_16SC1, 1, 0)

grad\_y = cv.Sobel(gray, cv.CV\_16SC1, 0, 1)

dst = cv.Canny(grad\_x, grad\_y, 30, 150)

self.ret=dst

# dst = cv.Canny(gray, 50, 150)

def btnSave3\_Clicked(self):

if not hasattr(self, "captured"):

return

cv.imwrite('byjc.jpg',self.ret)

print('保存成功')

def btnSuofang(self):#缩放图片

x,y=int(self.lineEdit.text()), int(self.lineEdit\_5.text())

img=self.captured

dst = cv.resize(img, (x, y))

self.suofang=dst

cv.imshow("dst: %d x %d" % (dst.shape[0], dst.shape[1]), dst)

cv.waitKey(0)

cv.destroyAllWindows()

def btnSave4\_Clicked(self):

if not hasattr(self, "captured"):

return

cv.imwrite('suofang.jpg',self.suofang)

print('保存成功')

def btnCut(self):

if not hasattr(self, "captured"):

return

img=self.captured

y0, y1 = int(self.lineEdit\_y0.text()), int(self.lineEdit\_y1.text())

x0, x1 = int(self.lineEdit\_x0.text()), int(self.lineEdit\_x1.text())

dst = img[y0:y1, x0:x1] # 裁剪坐标为[y0:y1, x0:x1]

self.cut=dst

cv.imshow('image', dst)

cv.waitKey(0)

def btnSave5\_Clicked(self):

if not hasattr(self, "captured"):

return

cv.imwrite('cut.jpg',self.cut)

print('保存成功')

def btnThreshold\_Clicked(self):

'''

Otsu自动阈值分割

'''

if not hasattr(self, "captured"):

return

\_, self.cpatured = cv.threshold(

self.cpatured, 0, 255, cv.THRESH\_BINARY + cv.THRESH\_OTSU)

rows, columns = self.cpatured.shape

bytesPerLine = columns

# 阈值分割图也是单通道，也需要用Format\_Indexed8

QImg = QImage(self.cpatured.data, columns, rows, bytesPerLine, QImage.Format\_Indexed8)

self.labelResult.setPixmap(QPixmap.fromImage(QImg).scaled(

self.labelResult.size(), Qt.KeepAspectRatio, Qt.SmoothTransformation))

if \_\_name\_\_ == "\_\_main\_\_":

app = QtWidgets.QApplication(sys.argv)

window = PyQtMainEntry()

window.show()

sys.exit(app.exec())

mainForm.py

# Form implementation generated from reading ui file 'OPCVui.ui'

#

# Created by: PyQt6 UI code generator 6.1.0

#

# WARNING: Any manual changes made to this file will be lost when pyuic6 is

# run again. Do not edit this file unless you know what you are doing.

from PyQt6 import QtCore, QtGui, QtWidgets

class Ui\_MainWindow(object):

def setupUi(self, MainWindow):

MainWindow.setObjectName("MainWindow")

MainWindow.resize(1242, 539)

self.centralwidget = QtWidgets.QWidget(MainWindow)

self.centralwidget.setObjectName("centralwidget")

self.label\_b = QtWidgets.QLabel(self.centralwidget)

self.label\_b.setGeometry(QtCore.QRect(670, 110, 541, 351))

font = QtGui.QFont()

font.setPointSize(24)

self.label\_b.setFont(font)

self.label\_b.setScaledContents(False)

self.label\_b.setAlignment(QtCore.Qt.AlignmentFlag.AlignCenter)

self.label\_b.setObjectName("label\_b")

self.label\_3 = QtWidgets.QLabel(self.centralwidget)

self.label\_3.setGeometry(QtCore.QRect(930, 480, 55, 16))

font = QtGui.QFont()

font.setPointSize(12)

self.label\_3.setFont(font)

self.label\_3.setObjectName("label\_3")

self.label\_2 = QtWidgets.QLabel(self.centralwidget)

self.label\_2.setGeometry(QtCore.QRect(420, 20, 361, 61))

font = QtGui.QFont()

font.setPointSize(28)

self.label\_2.setFont(font)

self.label\_2.setObjectName("label\_2")

self.layoutWidget = QtWidgets.QWidget(self.centralwidget)

self.layoutWidget.setGeometry(QtCore.QRect(10, 120, 591, 351))

self.layoutWidget.setObjectName("layoutWidget")

self.verticalLayout\_2 = QtWidgets.QVBoxLayout(self.layoutWidget)

self.verticalLayout\_2.setContentsMargins(0, 0, 0, 0)

self.verticalLayout\_2.setObjectName("verticalLayout\_2")

self.horizontalLayout\_28 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_28.setObjectName("horizontalLayout\_28")

self.label\_22 = QtWidgets.QLabel(self.layoutWidget)

self.label\_22.setObjectName("label\_22")

self.horizontalLayout\_28.addWidget(self.label\_22)

self.pushButton\_3 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_3.setObjectName("pushButton\_3")

self.horizontalLayout\_28.addWidget(self.pushButton\_3)

self.verticalLayout\_2.addLayout(self.horizontalLayout\_28)

self.verticalLayout = QtWidgets.QVBoxLayout()

self.verticalLayout.setSpacing(17)

self.verticalLayout.setObjectName("verticalLayout")

self.horizontalLayout\_2 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_2.setObjectName("horizontalLayout\_2")

self.verticalLayout.addLayout(self.horizontalLayout\_2)

self.horizontalLayout = QtWidgets.QHBoxLayout()

self.horizontalLayout.setObjectName("horizontalLayout")

self.verticalLayout.addLayout(self.horizontalLayout)

self.horizontalLayout\_16 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_16.setObjectName("horizontalLayout\_16")

self.horizontalLayout\_3 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_3.setObjectName("horizontalLayout\_3")

self.label\_4 = QtWidgets.QLabel(self.layoutWidget)

self.label\_4.setObjectName("label\_4")

self.horizontalLayout\_3.addWidget(self.label\_4)

self.pushButton\_2 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_2.setObjectName("pushButton\_2")

self.horizontalLayout\_3.addWidget(self.pushButton\_2)

self.horizontalLayout\_16.addLayout(self.horizontalLayout\_3)

self.horizontalLayout\_5 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_5.setObjectName("horizontalLayout\_5")

self.pushButton = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton.setObjectName("pushButton")

self.horizontalLayout\_5.addWidget(self.pushButton)

self.label\_7 = QtWidgets.QLabel(self.layoutWidget)

self.label\_7.setObjectName("label\_7")

self.horizontalLayout\_5.addWidget(self.label\_7)

self.lineEdit\_2 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_2.setObjectName("lineEdit\_2")

self.horizontalLayout\_5.addWidget(self.lineEdit\_2)

self.horizontalLayout\_16.addLayout(self.horizontalLayout\_5)

self.verticalLayout.addLayout(self.horizontalLayout\_16)

self.horizontalLayout\_17 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_17.setObjectName("horizontalLayout\_17")

self.horizontalLayout\_4 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_4.setObjectName("horizontalLayout\_4")

self.label\_5 = QtWidgets.QLabel(self.layoutWidget)

self.label\_5.setObjectName("label\_5")

self.horizontalLayout\_4.addWidget(self.label\_5)

self.pushButton\_4 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_4.setObjectName("pushButton\_4")

self.horizontalLayout\_4.addWidget(self.pushButton\_4)

self.horizontalLayout\_17.addLayout(self.horizontalLayout\_4)

self.horizontalLayout\_6 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_6.setObjectName("horizontalLayout\_6")

self.pushButton\_9 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_9.setObjectName("pushButton\_9")

self.horizontalLayout\_6.addWidget(self.pushButton\_9)

self.label\_8 = QtWidgets.QLabel(self.layoutWidget)

self.label\_8.setObjectName("label\_8")

self.horizontalLayout\_6.addWidget(self.label\_8)

self.lineEdit\_3 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_3.setObjectName("lineEdit\_3")

self.horizontalLayout\_6.addWidget(self.lineEdit\_3)

self.horizontalLayout\_17.addLayout(self.horizontalLayout\_6)

self.verticalLayout.addLayout(self.horizontalLayout\_17)

self.horizontalLayout\_18 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_18.setObjectName("horizontalLayout\_18")

self.horizontalLayout\_7 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_7.setObjectName("horizontalLayout\_7")

self.label\_6 = QtWidgets.QLabel(self.layoutWidget)

self.label\_6.setObjectName("label\_6")

self.horizontalLayout\_7.addWidget(self.label\_6)

self.pushButton\_5 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_5.setObjectName("pushButton\_5")

self.horizontalLayout\_7.addWidget(self.pushButton\_5)

self.horizontalLayout\_18.addLayout(self.horizontalLayout\_7)

self.horizontalLayout\_8 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_8.setObjectName("horizontalLayout\_8")

self.pushButton\_10 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_10.setObjectName("pushButton\_10")

self.horizontalLayout\_8.addWidget(self.pushButton\_10)

self.label\_9 = QtWidgets.QLabel(self.layoutWidget)

self.label\_9.setObjectName("label\_9")

self.horizontalLayout\_8.addWidget(self.label\_9)

self.lineEdit\_4 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_4.setObjectName("lineEdit\_4")

self.horizontalLayout\_8.addWidget(self.lineEdit\_4)

self.horizontalLayout\_18.addLayout(self.horizontalLayout\_8)

self.verticalLayout.addLayout(self.horizontalLayout\_18)

self.horizontalLayout\_21 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_21.setObjectName("horizontalLayout\_21")

self.horizontalLayout\_9 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_9.setObjectName("horizontalLayout\_9")

self.label\_10 = QtWidgets.QLabel(self.layoutWidget)

self.label\_10.setObjectName("label\_10")

self.horizontalLayout\_9.addWidget(self.label\_10)

self.pushButton\_6 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_6.setObjectName("pushButton\_6")

self.horizontalLayout\_9.addWidget(self.pushButton\_6)

self.horizontalLayout\_21.addLayout(self.horizontalLayout\_9)

self.horizontalLayout\_10 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_10.setObjectName("horizontalLayout\_10")

self.label\_11 = QtWidgets.QLabel(self.layoutWidget)

self.label\_11.setObjectName("label\_11")

self.horizontalLayout\_10.addWidget(self.label\_11)

self.lineEdit = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit.setObjectName("lineEdit")

self.horizontalLayout\_10.addWidget(self.lineEdit)

self.label\_18 = QtWidgets.QLabel(self.layoutWidget)

font = QtGui.QFont()

font.setPointSize(16)

self.label\_18.setFont(font)

self.label\_18.setObjectName("label\_18")

self.horizontalLayout\_10.addWidget(self.label\_18)

self.lineEdit\_5 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_5.setObjectName("lineEdit\_5")

self.horizontalLayout\_10.addWidget(self.lineEdit\_5)

self.label = QtWidgets.QLabel(self.layoutWidget)

self.label.setText("")

self.label.setObjectName("label")

self.horizontalLayout\_10.addWidget(self.label)

self.label\_17 = QtWidgets.QLabel(self.layoutWidget)

self.label\_17.setText("")

self.label\_17.setObjectName("label\_17")

self.horizontalLayout\_10.addWidget(self.label\_17)

self.horizontalLayout\_21.addLayout(self.horizontalLayout\_10)

self.horizontalLayout\_11 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_11.setObjectName("horizontalLayout\_11")

self.pushButton\_11 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_11.setObjectName("pushButton\_11")

self.horizontalLayout\_11.addWidget(self.pushButton\_11)

self.label\_12 = QtWidgets.QLabel(self.layoutWidget)

self.label\_12.setObjectName("label\_12")

self.horizontalLayout\_11.addWidget(self.label\_12)

self.lineEdit\_6 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_6.setObjectName("lineEdit\_6")

self.horizontalLayout\_11.addWidget(self.lineEdit\_6)

self.horizontalLayout\_21.addLayout(self.horizontalLayout\_11)

self.verticalLayout.addLayout(self.horizontalLayout\_21)

self.horizontalLayout\_26 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_26.setObjectName("horizontalLayout\_26")

self.horizontalLayout\_14 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_14.setObjectName("horizontalLayout\_14")

self.label\_15 = QtWidgets.QLabel(self.layoutWidget)

self.label\_15.setObjectName("label\_15")

self.horizontalLayout\_14.addWidget(self.label\_15)

self.pushButton\_8 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_8.setObjectName("pushButton\_8")

self.horizontalLayout\_14.addWidget(self.pushButton\_8)

self.horizontalLayout\_26.addLayout(self.horizontalLayout\_14)

self.horizontalLayout\_15 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_15.setObjectName("horizontalLayout\_15")

self.label\_16 = QtWidgets.QLabel(self.layoutWidget)

self.label\_16.setObjectName("label\_16")

self.horizontalLayout\_15.addWidget(self.label\_16)

self.lineEdit\_8 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_8.setObjectName("lineEdit\_8")

self.horizontalLayout\_15.addWidget(self.lineEdit\_8)

self.horizontalLayout\_26.addLayout(self.horizontalLayout\_15)

self.horizontalLayout\_19 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_19.setObjectName("horizontalLayout\_19")

self.pushButton\_13 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_13.setObjectName("pushButton\_13")

self.horizontalLayout\_19.addWidget(self.pushButton\_13)

self.label\_20 = QtWidgets.QLabel(self.layoutWidget)

self.label\_20.setObjectName("label\_20")

self.horizontalLayout\_19.addWidget(self.label\_20)

self.lineEdit\_11 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_11.setObjectName("lineEdit\_11")

self.horizontalLayout\_19.addWidget(self.lineEdit\_11)

self.horizontalLayout\_26.addLayout(self.horizontalLayout\_19)

self.verticalLayout.addLayout(self.horizontalLayout\_26)

self.horizontalLayout\_27 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_27.setObjectName("horizontalLayout\_27")

self.horizontalLayout\_12 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_12.setObjectName("horizontalLayout\_12")

self.label\_13 = QtWidgets.QLabel(self.layoutWidget)

self.label\_13.setObjectName("label\_13")

self.horizontalLayout\_12.addWidget(self.label\_13)

self.pushButton\_7 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_7.setObjectName("pushButton\_7")

self.horizontalLayout\_12.addWidget(self.pushButton\_7)

self.horizontalLayout\_27.addLayout(self.horizontalLayout\_12)

self.horizontalLayout\_13 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_13.setObjectName("horizontalLayout\_13")

self.label\_14 = QtWidgets.QLabel(self.layoutWidget)

self.label\_14.setObjectName("label\_14")

self.horizontalLayout\_13.addWidget(self.label\_14)

self.lineEdit\_y0 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_y0.setObjectName("lineEdit\_y0")

self.horizontalLayout\_13.addWidget(self.lineEdit\_y0)

self.horizontalLayout\_27.addLayout(self.horizontalLayout\_13)

self.lineEdit\_y1 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_y1.setObjectName("lineEdit\_y1")

self.horizontalLayout\_27.addWidget(self.lineEdit\_y1)

self.lineEdit\_x0 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_x0.setObjectName("lineEdit\_x0")

self.horizontalLayout\_27.addWidget(self.lineEdit\_x0)

self.lineEdit\_x1 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_x1.setObjectName("lineEdit\_x1")

self.horizontalLayout\_27.addWidget(self.lineEdit\_x1)

self.horizontalLayout\_20 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_20.setObjectName("horizontalLayout\_20")

self.pushButton\_12 = QtWidgets.QPushButton(self.layoutWidget)

self.pushButton\_12.setObjectName("pushButton\_12")

self.horizontalLayout\_20.addWidget(self.pushButton\_12)

self.label\_21 = QtWidgets.QLabel(self.layoutWidget)

self.label\_21.setObjectName("label\_21")

self.horizontalLayout\_20.addWidget(self.label\_21)

self.lineEdit\_12 = QtWidgets.QLineEdit(self.layoutWidget)

self.lineEdit\_12.setObjectName("lineEdit\_12")

self.horizontalLayout\_20.addWidget(self.lineEdit\_12)

self.horizontalLayout\_27.addLayout(self.horizontalLayout\_20)

self.verticalLayout.addLayout(self.horizontalLayout\_27)

self.verticalLayout\_2.addLayout(self.verticalLayout)

MainWindow.setCentralWidget(self.centralwidget)

self.menubar = QtWidgets.QMenuBar(MainWindow)

self.menubar.setGeometry(QtCore.QRect(0, 0, 1242, 22))

self.menubar.setObjectName("menubar")

self.menu = QtWidgets.QMenu(self.menubar)

self.menu.setObjectName("menu")

MainWindow.setMenuBar(self.menubar)

self.statusbar = QtWidgets.QStatusBar(MainWindow)

self.statusbar.setObjectName("statusbar")

MainWindow.setStatusBar(self.statusbar)

self.menubar.addAction(self.menu.menuAction())

self.retranslateUi(MainWindow)

self.pushButton\_2.clicked.connect(MainWindow.btnGray\_Clicked)

self.pushButton\_3.clicked.connect(MainWindow.btnReadImage\_Clicked)

self.pushButton.clicked.connect(MainWindow.btnSave1\_Clicked)

self.pushButton\_4.clicked.connect(MainWindow.btnFanse)

self.pushButton\_9.clicked.connect(MainWindow.btnSave2\_Clicked)

self.pushButton\_5.clicked.connect(MainWindow.btnByjc)

self.pushButton\_10.clicked.connect(MainWindow.btnSave3\_Clicked)

self.pushButton\_6.clicked.connect(MainWindow.btnSuofang)

self.pushButton\_11.clicked.connect(MainWindow.btnSave4\_Clicked)

self.pushButton\_12.clicked.connect(MainWindow.btnSave5\_Clicked)

self.pushButton\_7.clicked.connect(MainWindow.btnCut)

QtCore.QMetaObject.connectSlotsByName(MainWindow)

def retranslateUi(self, MainWindow):

\_translate = QtCore.QCoreApplication.translate

MainWindow.setWindowTitle(\_translate("MainWindow", "MainWindow"))

self.label\_b.setText(\_translate("MainWindow","<html><head/><body><p><br/></p></body><ml>"))

self.label\_3.setText(\_translate("MainWindow", "原图"))

self.label\_2.setText(\_translate("MainWindow", "Opencv图像处理程序"))

self.label\_22.setText(\_translate("MainWindow", "打开图片"))

self.pushButton\_3.setText(\_translate("MainWindow", "读取"))

self.label\_4.setText(\_translate("MainWindow", "转化灰度"))

self.pushButton\_2.setText(\_translate("MainWindow", "显示"))

self.pushButton.setText(\_translate("MainWindow", "保存"))

self.label\_7.setText(\_translate("MainWindow", "保存路径"))

self.lineEdit\_2.setText(\_translate("MainWindow", "C:\\Users\\Administrator\\Desktop\\PythonKS"))

self.label\_5.setText(\_translate("MainWindow", "反色处理"))

self.pushButton\_4.setText(\_translate("MainWindow", "显示"))

self.pushButton\_9.setText(\_translate("MainWindow", "保存"))

self.label\_8.setText(\_translate("MainWindow", "保存路径"))

self.lineEdit\_3.setText(\_translate("MainWindow", "C:\\Users\\Administrator\\Desktop\\PythonKS"))

self.label\_6.setText(\_translate("MainWindow", "边缘提取"))

self.pushButton\_5.setText(\_translate("MainWindow", "显示"))

self.pushButton\_10.setText(\_translate("MainWindow", "保存"))

self.label\_9.setText(\_translate("MainWindow", "保存路径"))

self.lineEdit\_4.setText(\_translate("MainWindow", "C:\\Users\\Administrator\\Desktop\\PythonKS"))

self.label\_10.setText(\_translate("MainWindow", "图片缩放"))

self.pushButton\_6.setText(\_translate("MainWindow", "显示"))

self.label\_11.setText(\_translate("MainWindow", "缩放尺寸"))

self.lineEdit.setText(\_translate("MainWindow", "Y"))

self.label\_18.setText(\_translate("MainWindow", "\*"))

self.lineEdit\_5.setText(\_translate("MainWindow", "X"))

self.pushButton\_11.setText(\_translate("MainWindow", "保存"))

self.label\_12.setText(\_translate("MainWindow", "路径"))

self.lineEdit\_6.setText(\_translate("MainWindow", "C:\\Users\\Administrator\\Desktop\\PythonKS"))

self.label\_15.setText(\_translate("MainWindow", "阈值分割"))

self.pushButton\_8.setText(\_translate("MainWindow", "显示"))

self.label\_16.setText(\_translate("MainWindow", "分割阈值"))

self.pushButton\_13.setText(\_translate("MainWindow", "保存"))

self.label\_20.setText(\_translate("MainWindow", "路径"))

self.lineEdit\_11.setText(\_translate("MainWindow", "C:\\Users\\Administrator\\Desktop\\PythonKS"))

self.label\_13.setText(\_translate("MainWindow", "图片裁剪"))

self.pushButton\_7.setText(\_translate("MainWindow", "显示"))

self.label\_14.setText(\_translate("MainWindow", "裁剪坐标"))

self.lineEdit\_y0.setText(\_translate("MainWindow", "y0"))

self.lineEdit\_y1.setText(\_translate("MainWindow", "y1"))

self.lineEdit\_x0.setText(\_translate("MainWindow", "x0"))

self.lineEdit\_x1.setText(\_translate("MainWindow", "x1"))

self.pushButton\_12.setText(\_translate("MainWindow", "保存"))

self.label\_21.setText(\_translate("MainWindow", "路径"))

self.lineEdit\_12.setText(\_translate("MainWindow", "C:\\Users\\Administrator\\Desktop\\PythonKS"))

self.menu.setTitle(\_translate("MainWindow", "测试"))

## 7、总结

## 8、参考文献

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3.John Zelle.《Python程序设计》，人民邮电出版社，2018，参考书目

4.Cay S.Horstmann.《Python程序设计》，机械工业出版社，2018，参考书目。