AKAZE DESKRIPTORLARI YORDAMIDA YUZNI TANIB OLISH DASTURIY TA'MINOTINI ISHLAB CHIQISH

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Annotatsiya. Bu maqolada AKAZE deskriptorlari muhimligi. AKAZE deskriptoridan foydalanib python 3.9.6 opencv-python 3.4.11.39 vositasida dastur tuzish ko'rib o'tilgan.

Kalit so'zlar: BRIEF, AKAZE, ORB, BRISK, SIFT, deskriptor, mahalliy deskriptorlar,

Abstract: The importance of AKAZE descriptors in this article. Python 3.9.6 opencv-python 3.4.11.39 program creation using the AKAZE descriptor is considered.

Keywords: BRIEF, ORB, BRISK, AKAZE descriptor, local descriptors.

Аннотация: Важность дескрипторов AKAZE в этой статье. Рассмотрено создание программы на Python 3.9.6 opencv-python 3.4.11.39 с использованием дескриптора AKAZE.

Ключевые слова:BRIEF, ORB, BRISK, AKAZE, SIFT, дескриптор, локальные дескрипторы

Deskriptor - bu xususiyatlar to'plamiga asoslangan holda tasvirning ba'zi bir mintaqasini aniqlaydigan usul. Ko'pincha tasvirlardagi obyektlarni izlash deskriptorlar yordamida solishtirishga asoslanadi. Ikki o'lchovli tasvir deskriptorlarining quyidagi guruhlari ajratiladi gradientga asoslangan deskriptorlar, lokal ikkilik deskriptorlar, spektral tasvirga asoslangan deskriptorlar, bazis funksiyali deskriptorlar, shakl deskriptorlari. Shuni ta'kidlash kerakki, ba'zi usullar, ularning xususiyatlariga ko'ra, bir vaqtning o'zida turli guruhlarga bo'linishi mumkin.

Mahalliy ikkilik identifikatorlar ikkilik vektorlar ko'rinishidagi tasvirning kichik maydonining tavsifidir. Eng mashhur mahalliy deskriptorlar mahalliy binar naqshlar va ularning modifikatsiyalari (Local Binary Patterns - LBP). Bu guruhga shuningdek BRIEF (Binary Robust Independent Elementary Features) , ORB (Oriented BRIEF),

BRISK (Binary Robust Invariant Scalable Keypoints) va boshqalar kiradi. SIFT (Scale-Invariant Feature Transform) – bu tasvirlardan xususiyatlar (kalit nuqtalar) olish uchun ishlatiladigan algoritm bo'lib, u har xil o'lcham va orientatsiyalardagi tasvirlardan barqaror va ishonchli xususiyatlar ajratib olish imkonini beradi. SIFT kengaytmasi sifatida SURF (Speeded-Up Robust Features) va ORB (Oriented FAST and Rotated BRIEF) algoritmlari mavjud bo'lib, ular ham tasvirlarni tanish va kalit nuqtalarni aniqlashda foydalaniladi.

AKAZE (Accelerated KAZE) deskriptori, KAZE algoritmini optimallashtirilgan shakli bo‘lib, samaradorlik va ishlash tezligini oshirish bilan birga yuqori aniqlikni saqlab qolishga qaratilgan. AKAZE kompyuter ko‘rish sohasida tasvirlarni qayta ishlash va xususiyatlarni aniqlash uchun juda muhim ahamiyatga ega.

AKAZE deskriptoridan foydalanishga doir Python dasturlash tilida tuzilgan dastur.

```
import cv2
import os
import tkinter as tk
from tkinter import simpledialog

# Yuzni aniqlash uchun Haar kaskadini yuklash
face_cascade = cv2.CascadeClassifier(cv2.data.haarcascades + 'haarcascade_frontalface_default.xml')

# AKAZE deskriptorini yaratish
akaze = cv2.AKAZE_create()

# Rasm saqlanadigan papka
images_folder = 'tasvir'

# Papka mavjud bo'lmasa, uni yaratish
if not os.path.exists(images_folder):
    os.makedirs(images_folder)

# Papkada mavjud bo'lgan rasmlarni yuklash va AKAZE deskriptorlarini hisoblash
saved_images = [os.path.join(images_folder, file) for file in os.listdir(images_folder) if file.lower().endswith(('.png', '.jpg', '.jpeg'))]
saved_descriptors = []
for image_path in saved_images:
    img = cv2.imread(image_path, 0)
    faces = face_cascade.detectMultiScale(img, 1.3, 5)
    for (x, y, w, h) in faces:
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        roi_gray = img[y:y + h, x:x + w]
        keypoints, descriptor = akaze.detectAndCompute(roi_gray, None)
        if descriptor is not None:
            saved_descriptors.append(descriptor)

# Rasm olish tugmasi parametrlari
capture_button_pressed = False
button_x, button_y, button_w, button_h = 10, 400, 150, 50

# Tugmani chizish funksiyasi
def draw_capture_button(frame):
    cv2.rectangle(frame, (button_x, button_y), (button_x + button_w, button_y + button_h), (0, 255, 0), -1)
    cv2.putText(frame, 'tasvir', (button_x + 30, button_y + 30), cv2.FONT_HERSHEY_SIMPLEX, 1, (255, 255, 255), 2)

# Sichqoncha bosilganligini aniqlash
def mouse_callback(event, x, y, flags, param):
    global capture_button_pressed
    if event == cv2.EVENT_LBUTTONDOWN:
        if button_x < x < button_x + button_w and button_y < y < button_y + button_h:
            capture_button_pressed = True

# Foydalanuvchidan ism va familiya so'rash funksiyasi
def ask_for_filename():
    root = tk.Tk()
    root.withdraw()
    file_name = simpledialog.askstring("Input", "Ism Familya kiriting:")
    root.destroy()
    return file_name

# Kamera ochish
cap = cv2.VideoCapture(0)

# Sichqoncha hodisasini sozlash
cv2.namedWindow('AKAZE deskriptori uchun dastur')
cv2.setMouseCallback('AKAZE deskriptori uchun dastur', mouse_callback)

while True:
```

```
    ret, frame = cap.read()
    if not ret:
        print("Kamera bilan muammo bor!")
        break

    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
    faces = face_cascade.detectMultiScale(gray, 1.3, 5)

    for (x, y, w, h) in faces:
        cv2.rectangle(frame, (x, y), (x + w, y + h), (255, 0, 0), 2)
        roi_gray = gray[y:y + h, x:x + w]
        keypoints, descriptor = akaze.detectAndCompute(roi_gray, None)

        if descriptor is not None:
            bf = cv2.BFMatcher(cv2.NORM_HAMMING, crossCheck=True)
            best_match_index = None
            best_match_count = 0

            for i, saved_descriptor in enumerate(saved_descriptors):
                if saved_descriptor is not None:
                    matches = bf.match(descriptor, saved_descriptor)
                    if len(matches) > best_match_count:
                        best_match_count = len(matches)
                        best_match_index = i

            if best_match_index is not None:
                cv2.putText(frame,          saved_images[best_match_index].split(os.sep)[-
1].split(".")[0], (x, y - 10),
                            cv2.FONT_HERSHEY_SIMPLEX, 1, (0, 255, 0), 2)

    draw_capture_button(frame)

    if capture_button_pressed:
        file_name = ask_for_filename()
        if file_name:
            file_path = os.path.join(images_folder, f'{file_name}.jpg')
            success = cv2.imwrite(file_path, frame)
            if success:
                print(f"Rasm saqlandi: {file_path}")
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```
            else:
                print("Rasmni saqlashda xato yuz berdi!")
        capture_button_pressed = False

    cv2.imshow('AKAZE deskriptori uchun dastur', frame)

    if cv2.waitKey(1) & 0xFF == ord('q'):
        break

cap.release()
cv2.destroyAllWindows()
```

Dasturda python versiyasi 3.9.6 opencv-python 3.4.11.39 dan foydalanilgan. inson1 va inson2 avvaldan mavjud rasmlar yuzni aniqlash uchun. Yuzni tanib olishda AKAZE deskriptoridan foydalanadi.

Foydalanilgan adabiyotlar ro'yxati

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