Report.pdf

January 11, 2019

1 CV Assignment 0: OpenCV and Chroma Keying

1.1 Task 1 Installing Opencv

I was able to successfully able to install and run opencv in python and c++. I can show it in the examples below.

1.2 Task 2 Chroma Keying

1.2.1 Subtask 1: Video to images

In [1]:
```
# Important Imports
import os
import cv2
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

In [2]:
```
# Function to convert videos to images using VideoCapture class in opencv

def video2image(path):
        """
                It will convert video to frames which are stored in a directory same nam

                params :=> Given path to any video (mpeg, mp4,avi)
                return: None
                files: takes video as input and returns a directory of frames

                incase path = 0(webcam), images are stored in a directory named webcam
        """

        # Initialize video
        cap = cv2.VideoCapture(path)

        if (cap.isOpened()== False):
                print("Error opening video stream or file")
                return
```

```
        # If path = 0 we are running the webcam
        if path == 0:
                dir_name = 'webcam'
        else:
                dir_name = path.split('.')[0]

        # Create the dir
        if not os.path.isdir(dir_name):
                os.mkdir(dir_name)

        # Write frames into the dir
        cnt = 0
        while cap.isOpened():
                ret,frame = cap.read()
                if ret == True:
                        cv2.imshow('Frame',frame)

                        cv2.imwrite('{}/{}.png'.format(dir_name,cnt),frame)
                        cnt += 1
                        # Press Q on keyboard to  exit
                        if cv2.waitKey(25) & 0xFF == ord('q'):
                                break
                else:
                        break
#                 if cnt >= 100:
#                         break
#                 else:
#                         break

        # Close files
        cap.release()
        cv2.destroyAllWindows()

        return
```

2 Testing for webcam and normal videos

```
Link to the frames folders:
        webcam:https://drive.google.com/drive/folders/1vepM6Evg5eI-LzOTpAdGmLm87nhVfhS-?usp=shar
    meme_video: https://drive.google.com/drive/folders/1JgsA2AG_LxiAVe15cMfke0tmZhO5aYSh?usp=sha
```

```
In [3]: video2image(0)
        video2image('meme_video.mp4')
```

2.0.1 Subtask 2 frames to video

```
In [4]: # Convert frame of images to a vide we are using mp4 format
        def image2video(dir_path):
```

```
    """
    It will convert frames to video which are stored in a directory same name as of

    params :=> Given path to any image dir (png, jpeg, jpg)
    return: None
    files : video(avi):

    """
    # Create a new video
    path = dir_path + '.avi'

    # Set parameters
    fps = 30.0
    width = 480
    height= 640
    fourcc = cv2.VideoWriter_fourcc(*'XVID')
    cap = cv2.VideoWriter(path,fourcc,fps,(height,width),1)


    # List elements and sort them using their names
    cnt = 0
    image_list = sorted(os.listdir(dir_path),key=lambda x: int(x.split('.')[0]))
    for filename in image_list:
            frame = cv2.imread(os.path.join(dir_path,filename))
            cnt += 1
            cap.write(frame)
            cv2.imshow('Frame',frame)
            # Press Q on keyboard to  exit
            if cv2.waitKey(25) & 0xFF == ord('q'):
                    break
    cap.release()
    cv2.destroyAllWindows()

    return
```

3 Testing for webcam and normal videos

```
Link to the videos:
        webcam:https://drive.google.com/drive/folders/1vepM6Evg5eI-LzOTpAdGmLm87nhVfhS-?usp=shar
    meme_video: https://drive.google.com/file/d/1qmSMu9gwaRR27YXQUDHWBQEsREZybNgd/view?usp=shari
```

```
In [7]: image2video('webcam')
        image2video('meme_video')
```

3.0.1 Subtask 3: Chroma Keying

```
In [9]: def croma_key(fg_video,bg_video):
```

```
"""
        Given a green screen video and a background merge the 2 create a new vid
        params :=> fg_video: foreground green screen image
                        bg_video: background screen image
"""

# Convert 2 videos to images
video2image(fg_video)
video2image(bg_video)


# Get their frame dir names
fg_dir = fg_video.split('.')[0]
bg_dir = bg_video.split('.')[0]
RED, GREEN, BLUE = (2, 1, 0)

# Create the list of images
cnt_list = [ int(file.split('.')[0]) for file in os.listdir(fg_dir)]
cnt_list1 = [ int(file.split('.')[0]) for file in os.listdir(bg_dir)]

cnt_list = sorted(cnt_list)
cnt_list1 = sorted(cnt_list1)

# Output dir name
out_dir = 'chroma'
for cnt in cnt_list:
        # Read and resize images
        fg_img = cv2.imread('{}/{}.png'.format(fg_dir,cnt))
        bg_img = next(iter(cnt_list1))
        h,w,c = fg_img.shape

        bg_img = cv2.imread('{}/{}.png'.format(bg_dir,bg_img))

        print(fg_img.shape,bg_img.shape)
        bg_img = cv2.resize(bg_img, (h,w))

        # Get mask
        reds = fg_img[:, :, RED]
        greens = fg_img[:, :, GREEN]
        blues = fg_img[:, :, BLUE]

        # Threshold  == 35
        mask = (greens < 35) | (np.amax(fg_img, axis=2) != greens)

        mask_fg = np.where(mask==1)
        mask_fg = np.array([mask_fg,mask_fg,mask_fg]).T
        mask_bg = np.where(mask==0)
        mask_bg = np.array([mask_bg,mask_bg,mask_bg]).T
```

```
                # Create new image
                new_image = np.zeros((w,h,c))
                new_image[mask_fg] = fg_img[mask_fg]
                new_image[mask_bg] = bg_img[mask_bg]

                # Write to output frames dir
                cv2.imwrite('{}/{}.png'.format(out_dir,cnt),new_image)

        # Convert to video
        image2video(out_dir)

        return
```

```
In [11]: croma_key('fire_bomb.mp4','meme_video.mp4')
```

3.1 Output of croma keying can be found here:

https://drive.google.com/file/d/1HRYDg37le4ldXV7ELT5OqDEQOlloM0Gz/view?usp=sharing