CSC 424 - PROJECT 3

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Contents

CHECKLIST

Mark off what items are complete, and put a P if partially complete. For the categories, name the filter and its points. If you crete more than one per category, list their names and their poitns below the required command for that catagory.

Total available points: 200(235 for CSC\CENG 524)

Done 20 Suitable length input video files and documentation turned in.

Done 20 Beyond tutorial 5 - Bunny hopping(rabbit.png)

Done 25 Resized video, frame rate, soundtrack

Done 20 You/pet/your own image (CSC 524 video) appears in your video
File name of your video: fileName of image: me.png

Done 35 Category I requirement
Item: 3) Added prop or character. The added item should appear to be a seamless element of the video.
File and location: In movieMaker, the MakeImage function takes in the type of image to add(basket in this case) and adds it to the list of images to draw. the basket.png is located inside the res folder.

Done 35 Category II requirement
Item: 2) Some warp that manipulates elements of an item added as in #3 above
File and location: The translateBird function located inside the movieMaker file uses translation equations to move the bird relative to the location of the basket.
It is called inside the buildFrame function. The birdie.png is located inside the res folder.

Done 35 Category III requirement
Item: 2) Implement chromakeying using a green background replacement.
How I implemented a garbage mask (if applicable): I created a sorbel edge detection filter to detect edges of the foreground image. The image generated has white edges while rest is black background.I then used the image generated by the filter as garbage mask and subtracted the white edge from the image color to create a black outline for the foreground image.
File and location: In movieMaker, inside imageComposition function, the MakeSobelFilter function is called to generate the mask. It is then subtracted(AND) from the result of the Vlahos equations. The background.jpg is located inside the res folder of the project.

Done 10 Attended final exam to show off your video.

NA 35 TEAM additional length and documentation

```
NA     20     TEAM Second "Beyond tutorial 5"

NA     35     TEAM Second "You/pet/your own image"

NA     35     TEAM only additional item 1:

              < Addtional info here>

NA     35     TEAM only additional item 2:

              < Addtional info here>

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NA     35     CSC\CENG 524 ONLY additional item
                    File name of your video:

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200  Total(please add the points and include the total here)
```

The grade you compute is the starting point for course staff, who reserve the right to change the grade if they disagree with your assessment and to deduct points for other issues they may encounter, such as errors in the submission process, naming issues, etc.

BASIC REQUIREMENTS

To load the sound for the video click on movie, and then “Open Audio File” and choose the file you want to play.

The source video for this project is in materials folder and is named “elephant green screen”. It can also be found in the res folder.

The source audio for the project video is called “birdie sound” and can be found in res and materials folder.

The size of the source video is 1280*720 pixels and the frame rate is 30fps as specified in the document.

The res folder also contains the xml file called 25sec.xml containing the default rotoscoped locations of the basket. Since the location of bird is relative to the basket, the bird is added whenever draw basket is clicked. Also, to save time, the project automatically opens the 25.sec xml file even if you click on any other file after clicking “File->Open”.

The final video is called “elephant” and is located inside the video folder at the root of the project.

Since the project generates an edge filter image for every frame, it takes a long time for generating a 25 second video. If not testing for garbage mask and want speed up, comment out line 270 in moviemaker file and replace line 286 with

newImage[c,r] = `ColorHelpers.ColorMultiply(alpha, color, back);`

SOMETHING BEYOND TUTORIAL 5

Where: The bunny hopping on the ground

How to use:

The program automatically adds a hopping bunny when you build a frame if the size of the video is 1280 * 720 pixels. If you want to change the image, you will have to change the location to the desired image at line 140.

YOUR OWN IMAGE/VIDEO

Where: My image is located on the back of the elephant

How to use:

The program automatically adds my image at the specified location when you build a frame. If you want to change the image, you will have to change the location to the desired image at line 141.

CATEGORY 1

Which item: 3. Added prop or character. The added item should appear to be a seamless element of the video.

Where in code:

I added a key shortcut for calling the makeImage, writeFrame,createOneFrame, and invalidate functions on the press of any key. There is also a button in the GUI called add basket which does the same. The makeImage function takes in an image type and adds that image to the list of images to be drawn inside the rotoscope class. I saved the type of images to be inserted and their location in xml using the load and store xml functions.

Seach for the comment "BASKET" in moviemaker, mainform and rotoscope files to get the functions involved in rotoscoping the basket.

***Where in video*:**

The basket is located on the top of the elephant's trunk.

How to use:

To add a basket simply click on the location you want to add the basket and then either hit a key or click on the draw basket menu option. This will add the basket to the frame and move to the next frame. Alternatively, you can open the source video and the 25Sec.xml file, hit create frame to view the first frame and then hit write and create the remaining.

CATEGORY 2

Which item:

2) Some warp that manipulates elements of an item added as in #3 above. Possibilities include wings that flap, arms that move, etc. Note: This means the warp **is relative** to one of the other pieces in the object (e.g. "orbiting"). The key thing is that one transformation is affected by a second, like in the frame rotation about the lightsaber center in tutorial 5.

Where in code:

I wanted the initial location of the bird to be the top-right of the basket. So, I calculated the left-most and right-most points and then calculated the location of the bird hopping using translation equations. The bird jumps up in 10 frames and jumps down in the next 10 frames. Since the location of the bird is relative to the basket, the translateBird function takes in the basket's location and calculates the bird's new location accordingly. This satisfies the second option of category "Image Warping" requirement of the project.

Search for the “TRANSLATE” comment in the moviemaker file.

***Where in video*:**

The bird hopping on the basket.

How to use:

Once you add a basket, the bird will automatically be positioned relative to the basket using the translation equations.You can add a basket using the steps discussed above.

CATEGORY 3

Which item: 2) Implement chromakeying using a green background replacement

Where in code:

I used the **Vlahos equations** inside the imageComposition function located inside movieMaker file for green screen replacement as below:

```
alpha = ColorHelpers.Clamp((1 - a1) * (color.G - (a2 * color.R))) ;
```

I kept the value of a1 as 10 and a2 as 1.2. The color in the above equation refers to the green screen video video pixel color. The ColorHelpers class contains a clamp function which clamps the value of above equation between 0 and 1. I also generated a garbage mask for the image using the sorbel edge filter. The edge filter made the edges white and the rest of the image black.

The alpha value calculated above was then passed through to the colorMultiply equation inside colorHelper class. The colorMultiply function used the alpha for calculating red,blue and green components as below:

```
(alpha * foregroundColor.R) + ((1 - alpha) * backgroundColor.R).
```

After that, I subtracted the garbage mask pixel colors from the above result thus effectively “anding” the garbage mask and the image to create a back outline for the foreground image.

Search for the “GARBAGEMASK” comment in moviemaker and “EQUATION” comment moviemaker and colorHelpers file.

***Where in video*:** The forest background of the video and the black outline.

How to use:

The background and outline is automatically added when building a new frame. To change background, add a new file called background to the Properties.Resources.background.

ATTRIBUTIONS

Elephant video

Cartoon Animal Green Screen - Elephant - Shout loop Stock Videos by Vecteezy

Basket image

Wicker png from pngtree.com

Bird image

cartoon png from pngtree.com

Birdie sound

Sound Effect by MD Jahid Hossain from Pixabay

Forest background

Image by brgfx on Freepik

Rabbit image

Nature Vectors by Vecteezy