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Section : __2_____

Triangulation Matting Project

Read all 4 images

```
bg1 = imread("bg1.png");
bg2 = imread("bg2.png");
fg1 = imread("fg1.png");
fg2 = imread("fg2.png");
```

Display all 4 images

```
% Combine pictures %
montage({bg1,bg2,fg1,fg2});
```



Convert to double

```
% Convert the image to data type double. %
db_bg1 = im2double(bg1);
db_bg2 = im2double(bg2);
db_fg1 = im2double(fg1);
db_fg2 = im2double(fg2);
```

Compute alpha

```
% above section %
red = ((db_fg1(:,:,1) - db_fg2(:,:,1)) .* (db_bg1(:,:,1) - db_bg2(:,:,1)));
green = ((db_fg1(:,:,2) - db_fg2(:,:,2)) .* (db_bg1(:,:,2) - db_bg2(:,:,2)));
blue = ((db_fg1(:,:,3) - db_fg2(:,:,3)) .* (db_bg1(:,:,3) - db_bg2(:,:,3)));
% below section %
below = (db_bg1(:,:,1) - db_bg2(:,:,1)).^2 + (db_bg1(:,:,2) - db_bg2(:,:,2)).^2 + (db_bg1(:,:,3) - db_bg2(:,:,3)).^2;
% above + below %
alpha = 1 - ((red + green + blue) ./ below);
```

Compute foreground colors of object from background 1

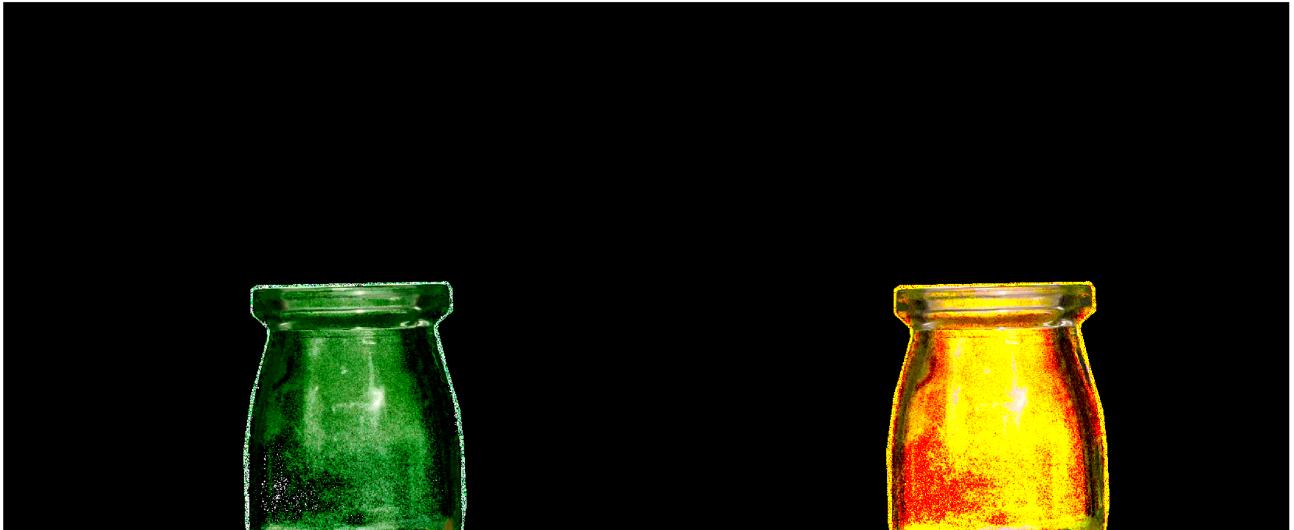
```
% foreground of the first picture %
fore_r1 = (db_fg1(:,:,1) - (1-alpha).*db_bg1(:,:,1)) ./ alpha;
fore_g1 = (db_fg1(:,:,2) - (1-alpha).*db_bg1(:,:,2)) ./ alpha;
fore_b1 = (db_fg1(:,:,3) - (1-alpha).*db_bg1(:,:,3)) ./ alpha;
```

Compute foreground colors of object from background 2

```
% foreground of the second picture %
fore_r2 = (db_fg2(:,:,1) - (1-alpha).*db_bg2(:,:,1)) ./ alpha;
fore_g2 = (db_fg2(:,:,2) - (1-alpha).*db_bg2(:,:,2)) ./ alpha;
fore_b2 = (db_fg2(:,:,3) - (1-alpha).*db_bg2(:,:,3)) ./ alpha;
```

Display the extracted foreground object / matte from background 1 and 2

```
% extract img 1 %
extr_img1 = cat(3, fore_r1, fore_g1, fore_b1);
extr_img2 = cat(3, fore_r2, fore_g2, fore_b2);
imshowpair(extr_img1, extr_img2, "montage");
```



Perform the composition of extracted foreground object from background 1 and 2 with the new WHITE background image

```
% Create white bg & convert to double %
[m,n,r] = size(bg1);
white_channel_img = ones(m,n,r);
white_channel_double = im2double(white_channel_img);

% Use prev photo & check if it's NaN, put 0 (make bg = white) %
extr_img1(isnan(extr_img1)) = 0;
extr_img2(isnan(extr_img2)) = 0;

% Put foreground + background %
extr_wh1 = (alpha.*im2double(extr_img1)) + ((1 - alpha).*white_channel_double);
extr_wh2 = (alpha.*im2double(extr_img2)) + ((1 - alpha).*white_channel_double);
```

Display the composition of extracted foreground object from background 1 and 2 with the new WHITE background image

```
montage({extr_wh1, extr_wh2});
```



Read new background image to do the composition and display it.

```
new_bg = imread("new_bg1.png");
imshow(new_bg);
```



Perform the composition of extracted foreground object from background 1 and 2 with the new background image

```
% Convert sea bg to double %
db_newbg = im2double(new_bg);

% Put foreground + background %
extr_sea1 = (alpha.*extr_img1) + ((1 - alpha).*db_newbg);
extr_sea2 = (alpha.*extr_img2) + ((1 - alpha).*db_newbg);
```

Display the composition of extracted foreground object from background 1 and 2 with the new background image

```
imshowpair(extr_sea1, extr_sea2, "montage");
```

