
Side Concept: Making the emoji's transparent to see the actual faces underneath - this is kinda weird looking so..

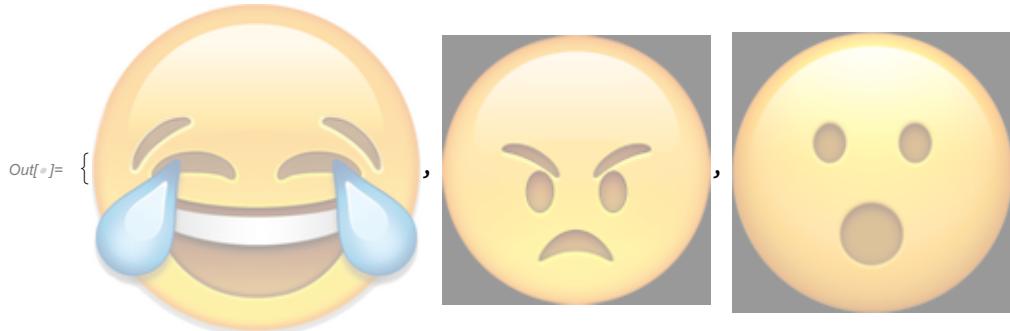
SetAlphaChannel will change the transparency of an image - however if there are already transparent parts to the image, they will be turned black, so we use RemoveBackground after to remove them again.

```
In[=] := SetAlphaChannel[image, .5]
```

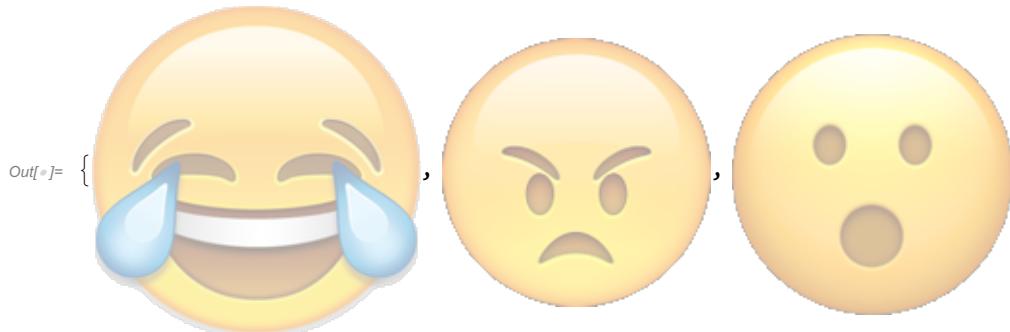
```
Out[=]=
```



```
In[6]:= emojis2 = SetAlphaChannel[#, .4] & /@ emojis
```



```
In[7]:= emojis3 = RemoveBackground /@ emojis2
```



```
In[7]:= match2[emotion_] := Switch[emotion,
  Indeterminate, emojis3[[4]],
  Entity["Word", "anger"], emojis3[[2]],
  Entity["Word", "surprise"], emojis3[[3]],
  Entity["Word", "neutral"], emojis3[[4]],
  Entity["Word", "happiness"], emojis3[[5]],
  Entity["Word", "sadness"], emojis3[[6]]
]
```

Combined Code

```
In[8]:= (* emoji set up *)
tearsofjoy2 = ImageTake[tearsofjoy, {1, 200}, {1, 200}];
pouting2 = ImageTake[pouting, {1, 160}, {1, 160}];
emojis = {tearsofjoy2, pouting2, surprised, neutral, smiling, frowning};
emojis = ImageCrop /@ emojis;
emojis = RemoveBackground /@ emojis;
(* findFaces set up *)
boxes = FindFaces[image3]; (* can replace image w/ different one *)
widths = #[[2]][[1]] - #[[1]][[1]] & /@ boxes;
vertices = #[[1]] & /@ boxes;
(* facialFeatures set up *)
emotions = FacialFeatures[image3, {"Emotion"}];
(* can replace image w/ different one *)
emotionsWords = #[[1]] & /@ emotions;
emojis2 = SetAlphaChannel[#, .4] & /@ emojis;
emojis3 = RemoveBackground /@ emojis2;
match2[emotion_] := Switch[emotion,
  Indeterminate, emojis3[[4]],
  Entity["Word", "anger"], emojis3[[2]],
  Entity["Word", "surprise"], emojis3[[3]],
  Entity["Word", "neutral"], emojis3[[4]],
  Entity["Word", "happiness"], emojis3[[5]],
  Entity["Word", "sadness"], emojis3[[6]]
]
imageFinal = image3; (* can replace image w/ different one *)
Table[imageFinal =
  ImageCompose[imageFinal, ImageResize[match2[emotionsWords[[n]]], widths[[n]]],
  vertices[[n]], {0, 0}], {n, 1, Length[boxes], 1}]
imageFinal
```



Side Concept: Face Replace Yourself!

Let's try using our program on ourselves!

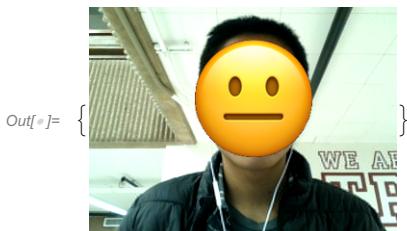
CurrentImage[] will take a picture through your webcam.

```
In[6]:= me = CurrentImage[]
```



```
Out[6]=
```

```
In[6]:= (* emoji set up *)
tearsofjoy2 = ImageTake[tearsofjoy, {1, 200}, {1, 200}];
pouting2 = ImageTake[pouting, {1, 160}, {1, 160}];
emojis = {tearsofjoy2, pouting2, surprised, neutral, smiling, frowning};
emojis = ImageCrop /@ emojis;
emojis = RemoveBackground /@ emojis;
(* findFaces set up *)
boxes = FindFaces[me];(* can replace image w/ different one *)
widths = #[[2]][[1]] - #[[1]][[1]] & /@ boxes;
vertices = #[[1]] & /@ boxes;
(* facialFeatures set up *)
emotions = FacialFeatures[me, {"Emotion"}];(* can replace image w/ different one *)
emotionsWords = #[[1]] & /@ emotions;
match[emotion_] := Switch[emotion,
  Indeterminate, emojis[[4]],
  Entity["Word", "anger"], emojis[[2]],
  Entity["Word", "surprise"], emojis[[3]],
  Entity["Word", "neutral"], emojis[[4]],
  Entity["Word", "happiness"], emojis[[5]],
  Entity["Word", "sadness"], emojis[[6]]
]
imageFinal = me;(* can replace image w/ different one *)
Table[imageFinal =
  ImageCompose[imageFinal, ImageResize[match[emotionsWords[[n]]], widths[[n]]],
  vertices[[n]], {0, 0}], {n, 1, Length[boxes], 1}]
ImageCollage[{me, imageFinal}]
```



Hmm... Let's see if we can get different emojis by changing our facial expressions into different emotions.

`ImageCapture[]` is another webcam picture function that helps with capturing several different pic-

tures by providing a preview through the webcam.

ImageCapture[]

Another idea: let's try to label the emoji with what emotion was recognized.

If we are to ImageCompose text onto an image, we need to get Text, turn it into Graphics, then turn it into an image.

This unfortunately ruins some of the quality but it is the only way as of now.

```
In[=] := Image@Graphics@Text@Style["anger", 12, Bold, FontFamily → "Comic Sans MS"]
```

Out[=]=



Right now, the background of the text image is all white and we want it to be transparent, so let's use RemoveBackground again.

This time, we will add the argument, {“Background”, White} at the end, which specifies what color in the image we want to turn transparent. This will help us get rid of the white inside and in between the letters.

```
In[6]:= text = RemoveBackground[
  Image@Graphics@Text@Style["anger", 12, Bold, FontFamily -> "Comic Sans MS"], {"Background", White}]
```

Out[6]= 

Now let's image compose this on top of an emoji.

```
In[7]:= ImageCompose[emojis[[4]], text]
```



If we want to position the text somewhere else, we can specify the coordinates in ImageCompose

```
In[8]:= ImageCompose[emojis[[4]], text, {73, 12}]
```



Now that we have this down, let's map the correct emotion to the face, creating a text function to

change what text will show and changing the match function from before.

```
In[1]:= text2[txt_] :=
  RemoveBackground[Image@Graphics@Text@Style[txt, 12, Bold, FontFamily -> "Comic Sans MS"],
  {"Background", White}]

In[2]:= match[emotion_] := ImageCompose[
  Switch[emotion,
    Indeterminate, emojis[[4]],
    Entity["Word", "anger"], emojis[[2]],
    Entity["Word", "surprise"], emojis[[3]],
    Entity["Word", "neutral"], emojis[[4]],
    Entity["Word", "happiness"], emojis[[5]],
    Entity["Word", "sadness"], emojis[[6]]
  ],
  text2[emotion]
, {73, 12}
]

In[3]:= match[Indeterminate]
```



Out[3]=



Out[4]=

Finally, we can combine this with the finished code from earlier.

Combined Code

```
me = CurrentImage[]
```

```

In[=]:= (* emoji set up *)
tearsofjoy2 = ImageTake[tearsofjoy, {1, 200}, {1, 200}];
pouting2 = ImageTake[pouting, {1, 160}, {1, 160}];
emojis = {tearsofjoy2, pouting2, surprised, neutral, smiling, frowning};
emojis = ImageCrop /@ emojis;
emojis = RemoveBackground /@ emojis;
(* findFaces set up *)
boxes = FindFaces[me]; (* can replace image w/ different one *)
widths = #[[2]][[1]] - #[[1]][[1]] & /@ boxes;
vertices = #[[1]] & /@ boxes;
(* facialFeatures set up *)
emotions = FacialFeatures[me, {"Emotion"}]; (* can replace image w/ different one *)
emotionsWords = #[[1]] & /@ emotions;
text2[txt_] :=
  RemoveBackground[Image@Graphics@Text@Style[txt, 12, Bold, FontFamily → "Comic Sans MS"],
  {"Background", White}] (* text *)
match[emotion_] := ImageCompose[
  Switch[emotion,
    Indeterminate, emojis[[4]],
    Entity["Word", "anger"], emojis[[2]],
    Entity["Word", "surprise"], emojis[[3]],
    Entity["Word", "neutral"], emojis[[4]],
    Entity["Word", "happiness"], emojis[[5]],
    Entity["Word", "sadness"], emojis[[6]]
  ]
  , text2[emotion]
  , {73, 12}
]
]
imageFinal = me; (* can replace image w/ different one *)
Table[imageFinal =
  ImageCompose[imageFinal, ImageResize[match[emotionsWords[[n]]], widths[[n]]],
  vertices[[n]], {0, 0}], {n, 1, Length[boxes], 1}]
ImageCollage[{me, imageFinal}] (* can replace image w/ different one *)

```





Adory Vo
adoryvo.github.io | www.abbymath.com
CT@TP: Computational Thinking at Torrey Pines High School
March 2019