STA314: Assignment 1, Fall 2020

load packages

```
library(imager)
library(tidyverse)
library(tidymodels)
library(sp)
library(scales)
library(cowplot)
library(dmc)
```

```
source('functions.R')
```

load a image

Load the image that is from "./avatar.jpg".

```
image_file_name = "./avatar.jpg"
```

Figure 1: Original image

process_image

To process the original image data, use the `kmeans` method to divide the R, G, and B data into k categories to obtain different category colors.

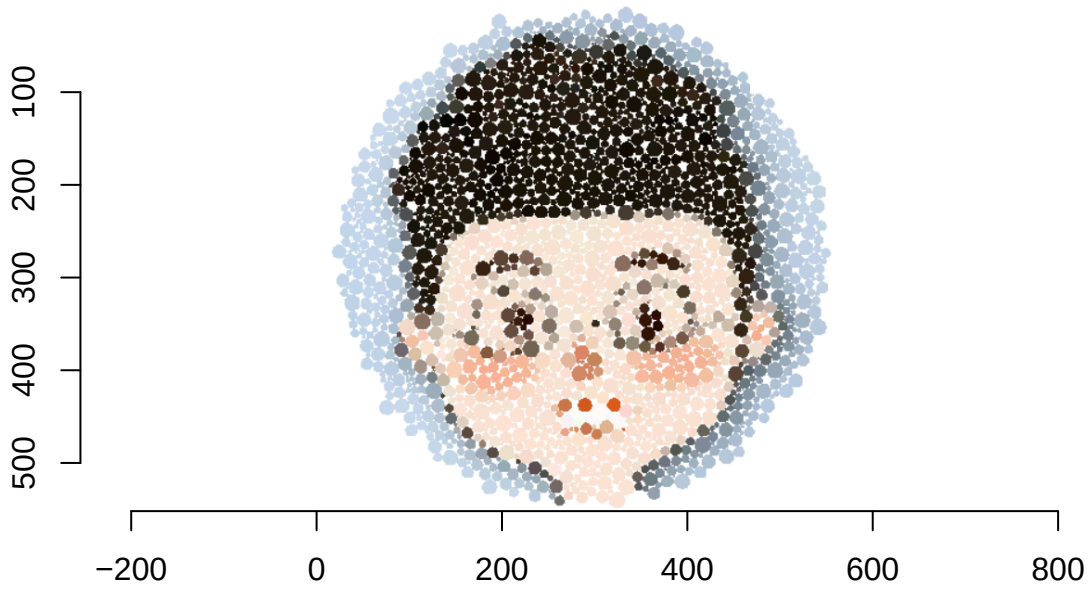
Input:

- image_file_name - a PNG or JPEG image.
- out - the number of centres in the clustering

Output:

- cluster_info: a [list] that contain
- the original output of the kclust calls,
- the tidied clusters, their associated RGB values and their nearest DMC thread colour information in `result`.

```
k_list = c(2:5)
cluster_info = process_image(image_file_name, k_list)
```



scree_plot

Input:

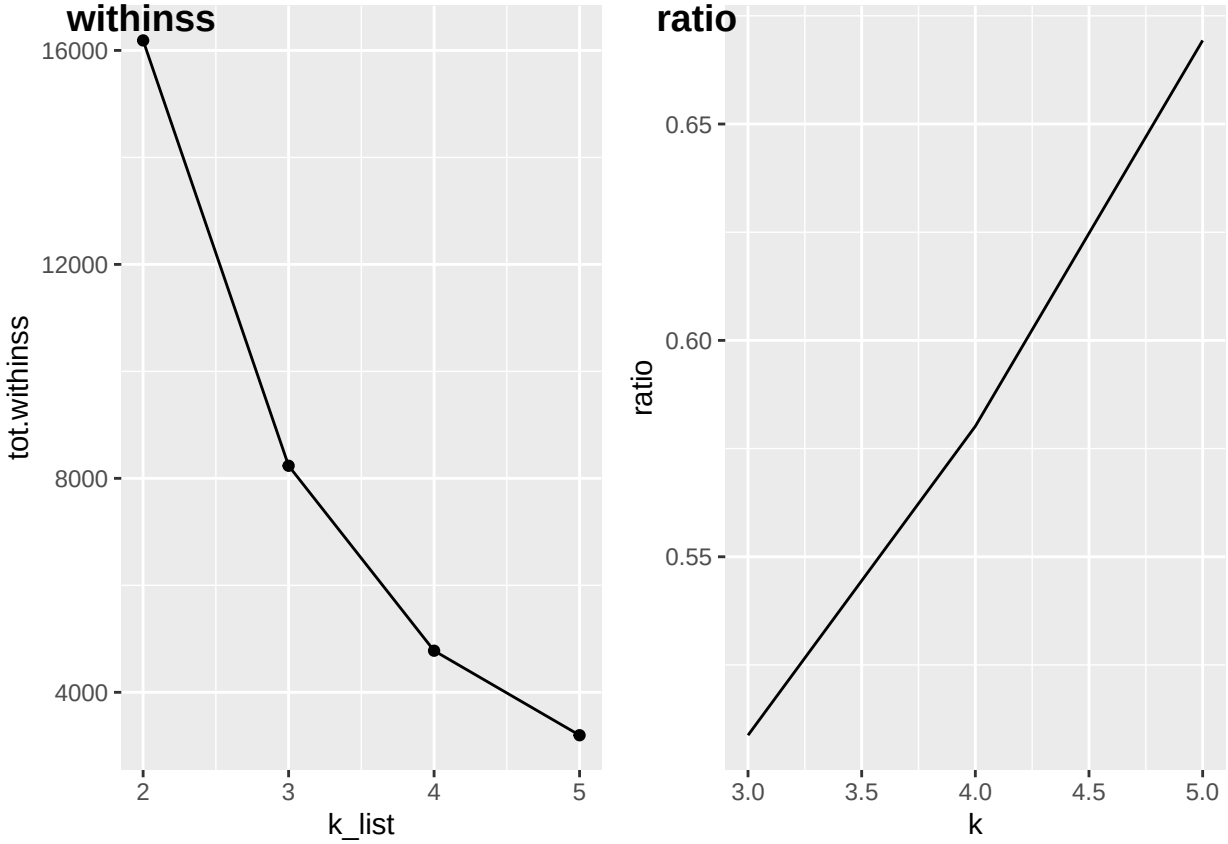
- the element of function `process_image`.

Output:

- a graph

This function is mainly for drawing

```
scree_plot(cluster_info[[2]])
```



color_strips

This function gets the hex value corresponding to each category.

Input:

- the element of function `process_image`

Output:

- a dataframe: x,y,R,G,B,cluster,dmc,name,hex.
- a graph.

```
k = 4
one_cluster_info = colour_strips(cluster_info[[2]][k-1,])
```

make_pattern

Input:

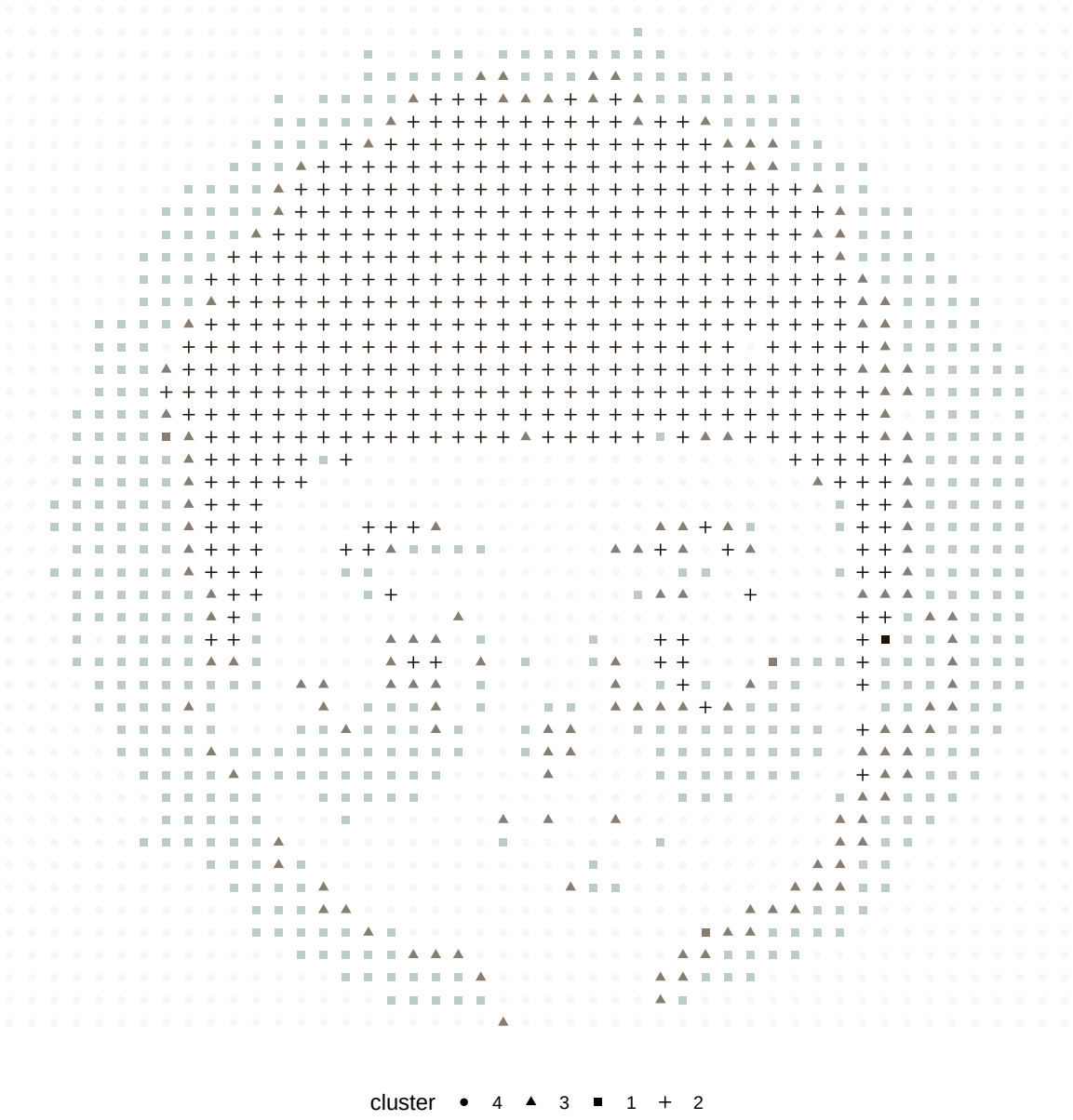
- cluster_info - The output of process_image
- k - The chosen cluster size
- x_size - The (approximate) total number of possible stitches in the horizontal direction
- black_white - (logical) Print the pattern in black and white (TRUE) or colour (FALSE,default)
- background_colour - The colour of the background, which should not be stitched in the pattern. (Default is to not have a colour)

Output:

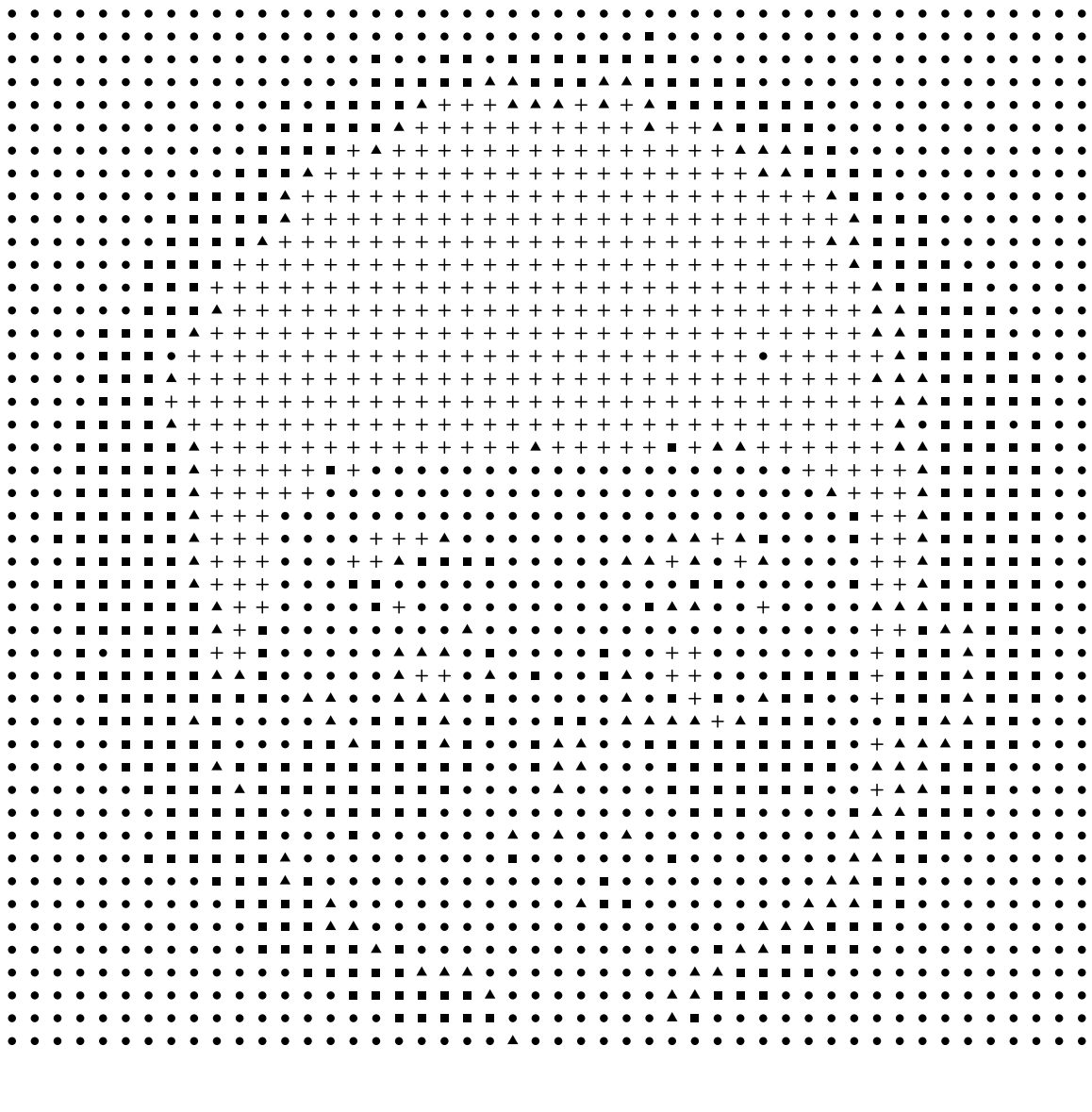
- A graph which denoted by `k, x_size, black_white,background_colour`.

Output the results of three different modes respectively

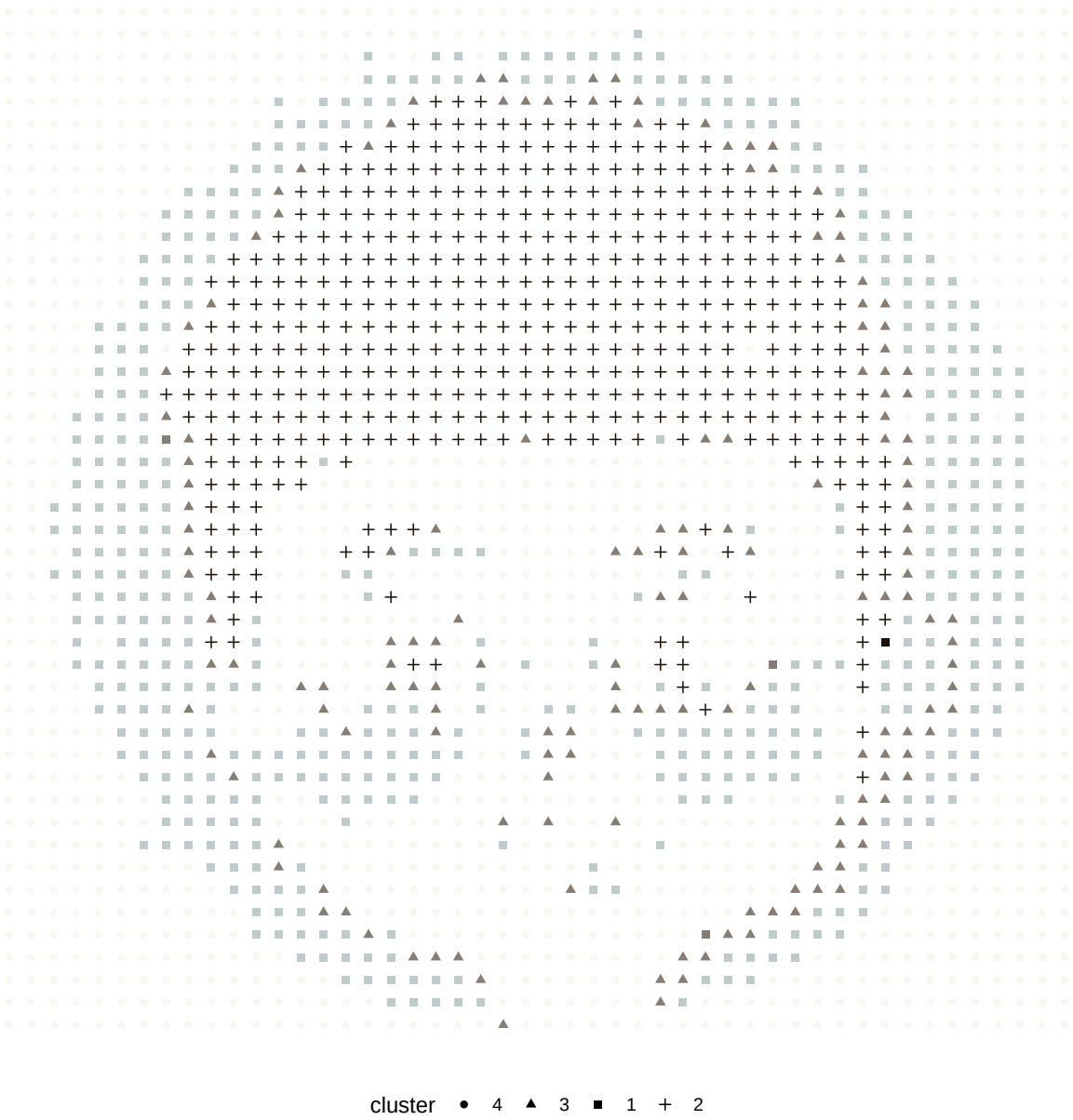
```
make_pattern(one_cluster_info, k = k, x_size = 50, black_white = FALSE, background_colour = NULL)
```




```
make_pattern(one_cluster_info, k = k, x_size = 50, black_white = TRUE, background_colour = NULL)
```




```
make_pattern(one_cluster_info, k = k, x_size = 50, black_white = FALSE, background_colour = "#025880")
```


cluster
4
3
1
2