EE2703: Assignment 4 Report

Keyboard Analysis

EE23B092

1 Assumptions Made

The function takes 3 parameters: text, keys, and characters. The liberty I have taken is to assume that keys and characters are dictionaries. I have also taken the liberty of assuming that the module (in which the layout is present) is not passed to the function but rather the dictionaries in the layout are.

I have assumed that the distances are measured from the position of the start key associated for every key. Therefore, even if in practice the space bar is zero distance (as the thumbs are hovering over it), the distance associated with a space is entirely dependent on the layout (specifically the coordinates of each key).

In addition to this, I have made an assumption with regards to the width and height of the key which might become problematic when the coordinates change with respect to each other

2 Approach for calculating the distances and frequencies

The approach taken is straight-forward. Each character is a key in the dictionary associated with each purpose. For frequency, simply add 1 to the value every time the character occurs.

For calculating the distance, I access the start key for each character, get the position of the start key and find the euclidean distance between the character and the start character. Add this euclidean distance, for every occurrence of the character.

3 Approach for getting the heatmap and keyboard

Firstly, I get the color-map associated with the frequencies of the characters. Then, the colors associated with each character and the characters that occur less frequent than the former are combined together and stored in a dictionary.

Using these colors, gradient (set of radial colors) are generated. These gradients are generated by creating large number of points (1000 in this case) of a circle and obtaining radii. This radii can be used as a mask to create a circular gradient. The color values associated with each key are then used to create a Linear Segmented Color Map which along with the masking of the radii, creates smooth radial gradients which are then placed above the keyboard keys.

For the gradient, ax.imshow was used to display the gradient and ax.add_patch was used to add rectangles to symbolize the keys. For the smooth transition, each color's transparency was set as a function of this relative frequency.

4 Observations

For a lot of texts, the character E was in most cases, the most frequently occurring character or was in the second place for shorter sentences. If the text was given in title case, the shift keys tend to dominate in terms of frequency. Less frequently occurring characters like Q and Z tend to be at the last for longer texts.