EEE3032 – Computer Vision and Pattern Recognition Coursework Assignment

# Abstract

This report goes over the theory, descriptions and experimental results of visual search techniques used to implement the visual search algorithms to search through the provided Microsoft Research (MSVC-v2) dataset. Multiple visual search techniques were implemented and tested. These include but are not limited to Global Average Colour, Global Colour Histogram, Edge Orientation. Techniques such as Principal component analysis were used to see if there were improvements in performance and multiple different distance measures were used.

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# Visual Search Techniques

## Global Average Colour

Global Average Colour takes the RGB colours of every pixel in the image and then takes the average ultimately ending up with a single RGB value.

In MATLAB this is achieved by taking each colour channel separately reshaping the channels into an array and then taking the average value of the array.

## Global Colour Histogram

Global Colour Histogram represents the overall colour distribution of the image. The histogram represents the number of pixels each colour in the image has. These colours span the images colour space which is RGB quantized. Each colour is quantized into number of divisions and then represented in the base number of divisions (For example if number of divisions is 4 then the colours are represented in base 4). This has transformed each value from RGB to a value bin. Then these bins are computed into a histogram.

In MATLAB this is achieved by first normalising the image to the range of 0 to level of quantization minus one. Each channel of the normalised image is then summed into a single value bin. All these values are then combined into an array and computed into a histogram.

## Edge Orientation Histogram

Edge Orientation estimates the edge direction for each pixel of the image. Edge orientation for each pixel is calculated in degrees and then normalised. These values are then typically quantised into 8 bins of orientation.

In MATLAB this is achieved by getting the gradient of the image which gives an angle value of -180 to 180. These values are then normalised into values from 0 to 1 and quantised into 8 bins and computed into a histogram

## Spatial Grid

## PCA

# Experimental Results

# Conclusion