Computer Vision hw_3

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1. Histogram Equalization:

   $s_k = 255\times\sum_{j=0}^{k}\frac{n_j}{n}$

   $k = 0\ to\ 255, n_j: number\ of\ pixels\ with\ intensity\ j$

   $n: total\ number\ of\ pixels(rows * cols)$

   $for\ \forall\ pixel, if\ I(im,i,j) = k\ then\ I(imhe,i,j) = s_k$

2. Implementation

   note: Opencv io function are used.

   Functions pixel_set, pixet_get are both defined in my first homework.

```
int * histogram_equlization(Mat *image){
        int *intensity=histogram(image, "he_histogram.bmp");
        int s[256];
        float he[256];
        for(int i=0;i<256;i++){
                s[i]=0;
                he[i]=0;
                for(int j=0;j<=i;j++){
                        he[i]+=(float)intensity[j];
                }
                s[i]=255*he[i]/(image->rows*image->cols);
        }
        for(int i=0;i<image->rows;i++){
                for(int j=0;j<image->cols;j++){
                        pixel_set(image, i, j, s[(int)pixel_get(image, i, j)]);
                }
        }
        delete []intensity;
        return histogram(image, "he_histogram.bmp");
}
```

3. Result:

   i. Original Lena.bmp and it's histogram:

ii. After histogram equalization:

4. Appendix
   i. R01922124_HW3.cpp
   ii. R01922124_HW3.pdf
   iii. lena.bmp
   iv. eq_lena.bmp
   v. histogram.bmp
   vi. eq_histogram.bmp
   vii. build_all.sh