Equalization and Quantization

Assignment 3

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ABR Lab – BEP

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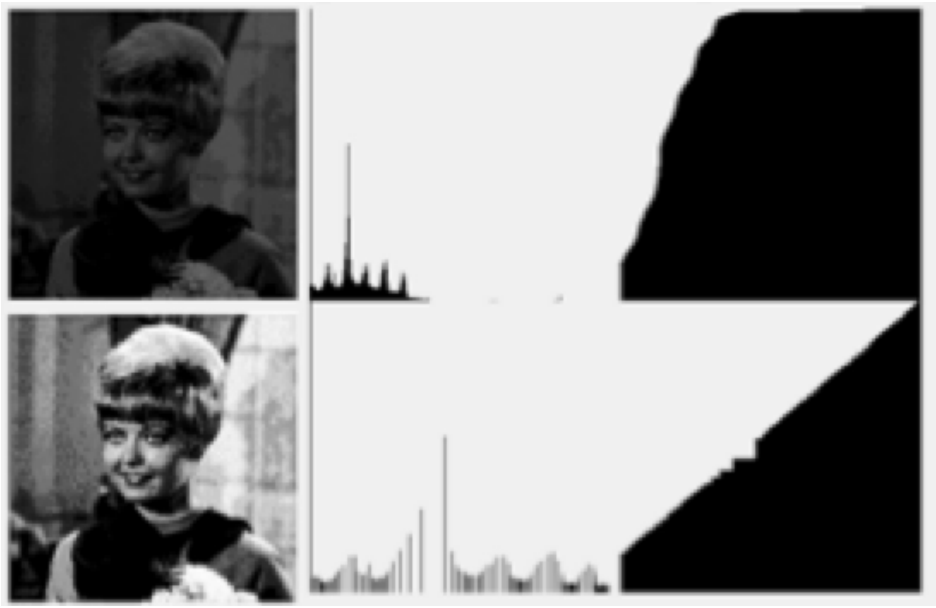
Equalization

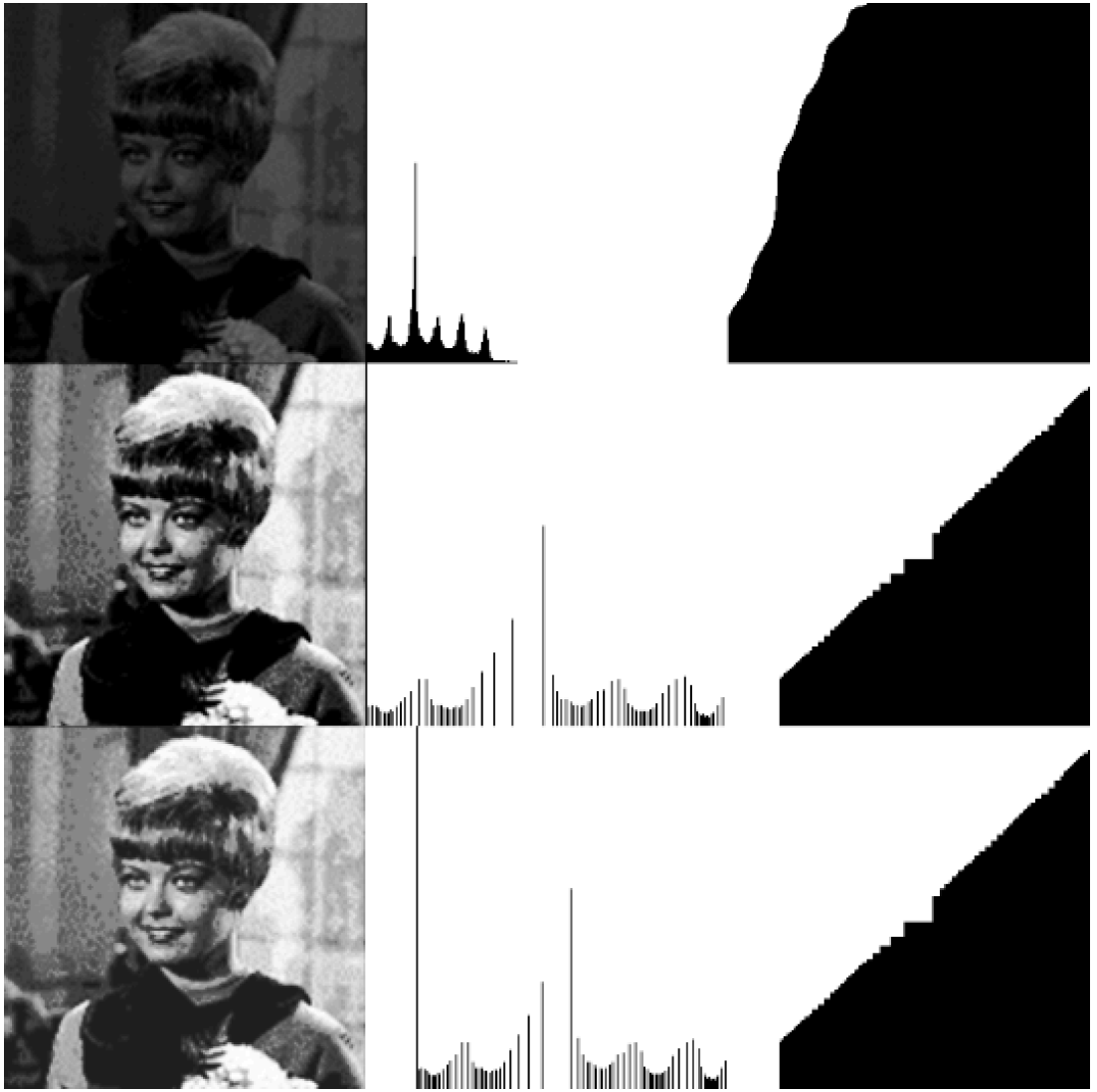
- Adjusts the image's contrast.
- The cdf is increased uniformly and the values are normalized between 0 and 255.



Equalization - Code

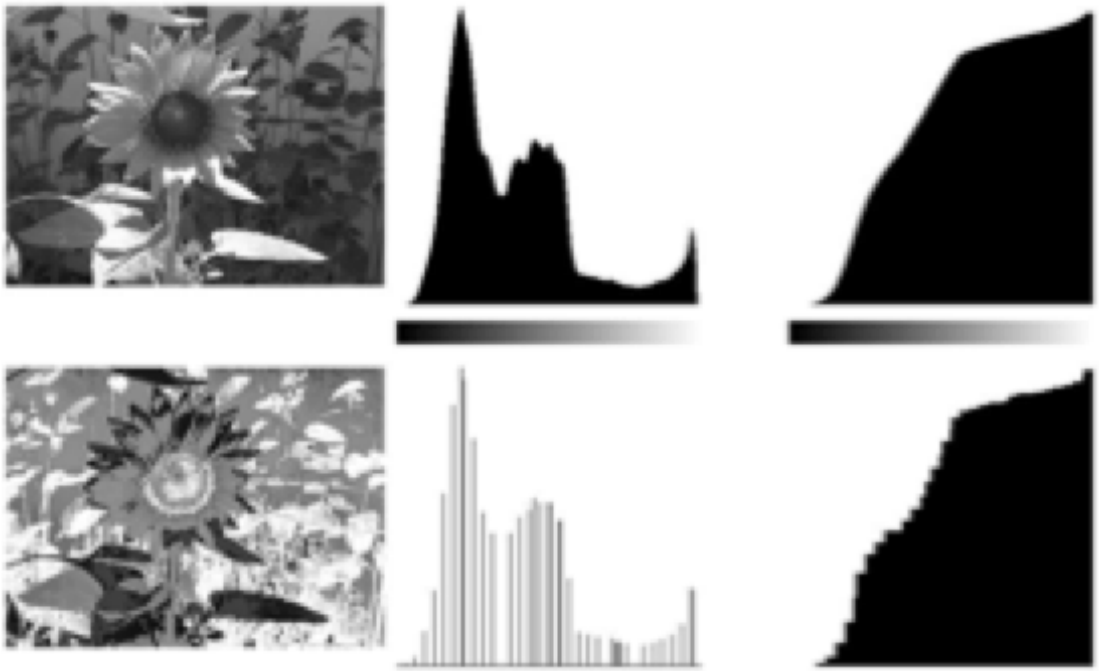
```
int size = mat.total();
double alpha = 255.0/size; //scaling factor

//Normalize the histogram so that the sum of histogram bins is 255.
//Compute the integral of the histogram
double LUT[256];
LUT[0] = alpha*histogram[0];
for (int i = 1; i < 256; i++){
	LUT[i] = LUT[i-1] + alpha*histogram[i];
}

//Map the levels to the new picture (look up table)
for (int i = 0; i < mat.rows; i++){
	for (int j = 0; j < mat.cols; j++){
		equalizeImageCustom.at<uchar>(i,j) = cvRound(LUT[mat.at<uchar>(I,j)]);
	}
}
```

Equalization - Result



Quantization

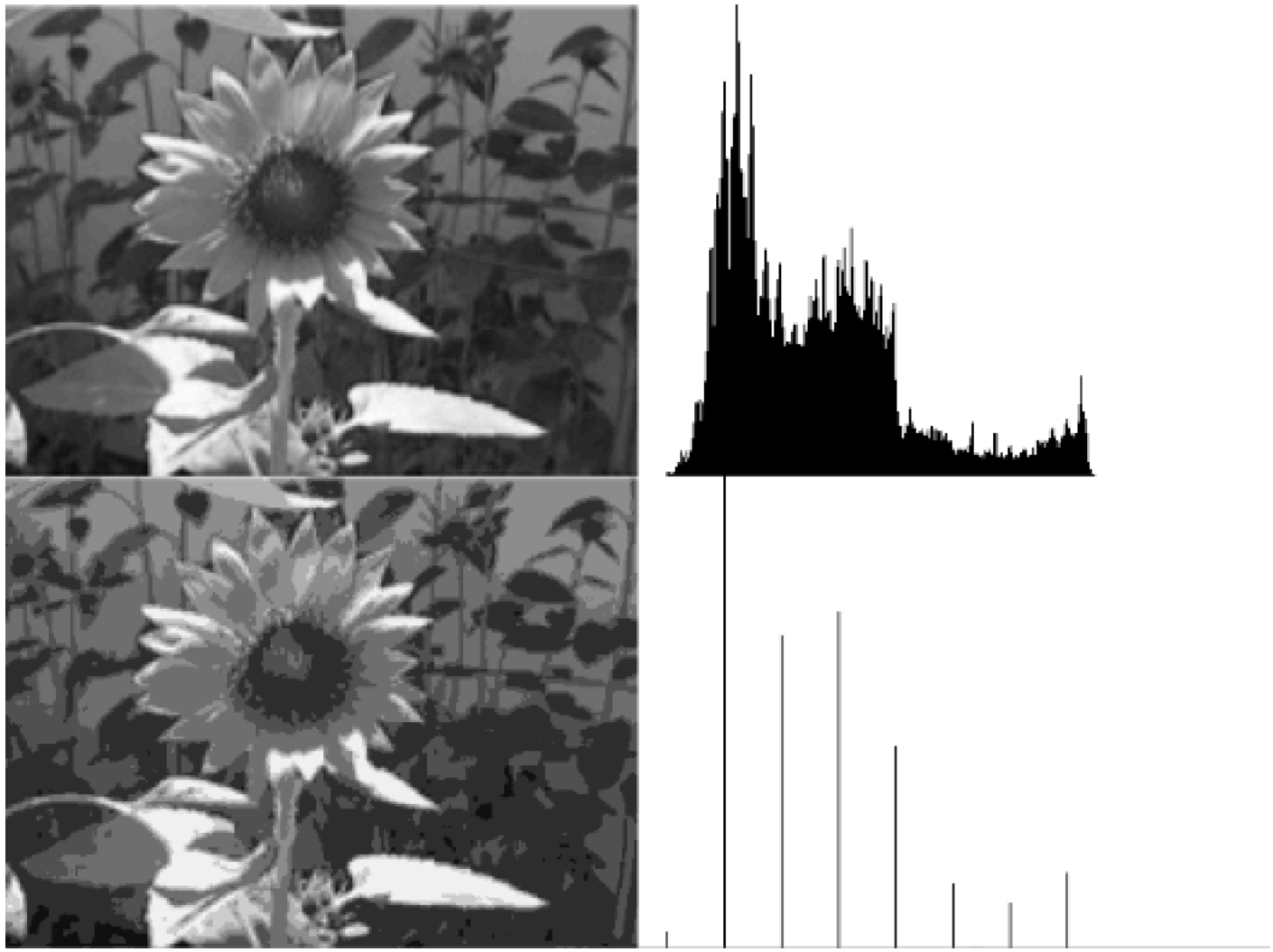
- Represents an image using a relatively smaller discrete set of values, like less pixels, colors or intensity.



Quantization - Code

```
//Decide quantization factor (x/div)
size_t div = 32;
uchar buffer[256];
for (size_t i = 0; i != 256; ++i) {
    buffer[i] = i / div * div + div/2;
}
//Transformation table
cv::Mat table(1, 256, CV_8U, buffer, sizeof(buffer));
//Performs a look-up table transform of an array
cv::LUT(mat, table, quantizationImage);
```

Quantization - Result



Histogram - Application