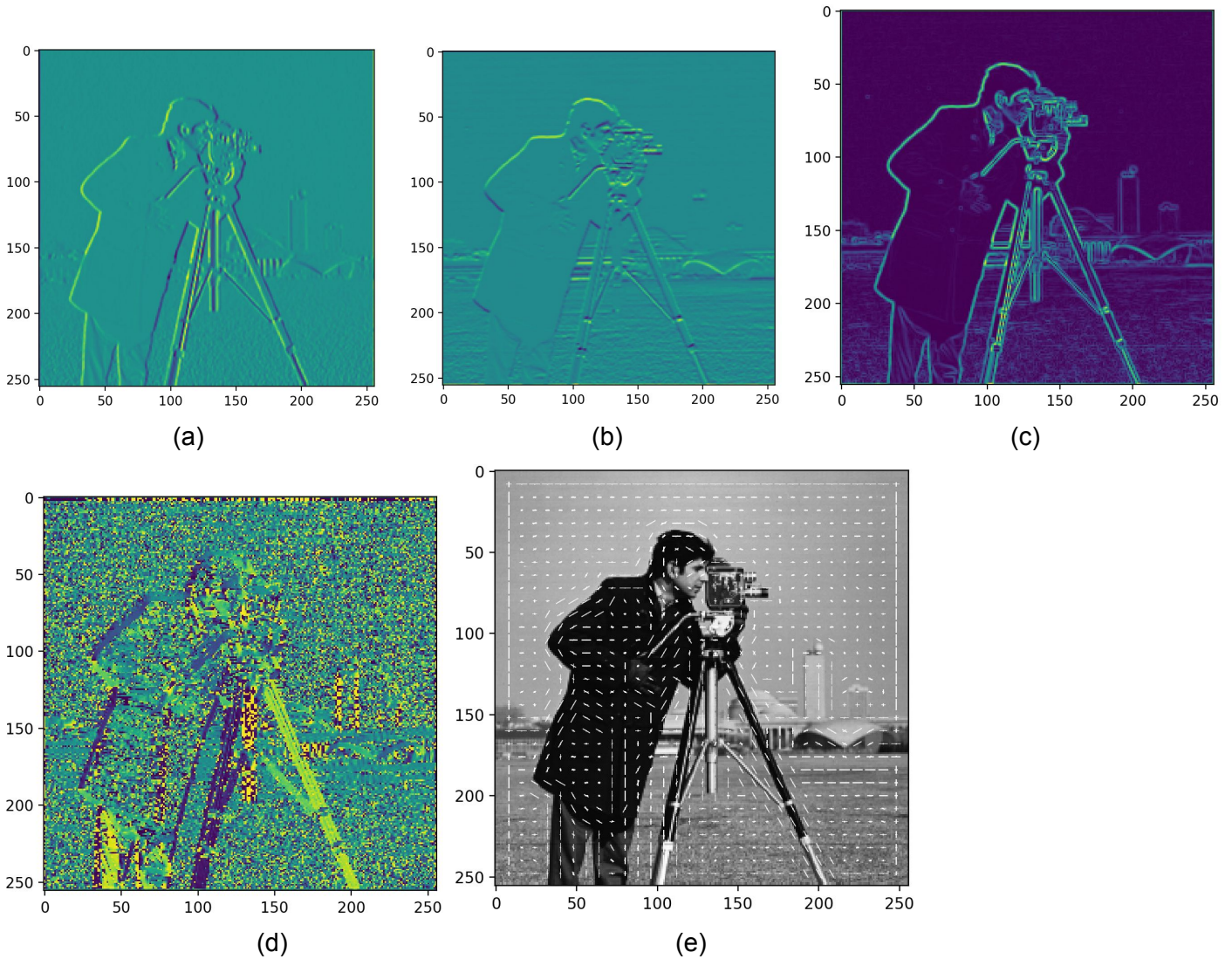# Homework-1

(a)

(b)

(c)

(d)

(e)

Figure (a) – **Differential Image(x-axis)**; *Figure (b)* – **Differential Image(y-axis)**; *Figure (c)* – **Gradient Magnitude** *Figure* (d) – **Gradient Angle**; *Figure (e)* – **HOG Visualization (Cell - 8, Block - 2)**

First the Grey-scale image is converted to float and normalized to range [0,1]. Next differential filter along x-axis([1,0,-1],[2,0,-2],[1,0,-1]) and y-axis(transpose of x-filter) are applied to the image to get differential filtered images as shown in Figure (a) and (b). Padding with zeros is used to keep the filter in bounds. Next gradient magnitude and gradient angle is calculated as shown in Figure (c) and (d). The gradient angle is kept in range [0,180) by taking modulo with 180. Next the Image is divided into cells and the gradient magnitudes are divided into bins based on gradient angles for each cell. Next the cells are blocked together using a given block size and L2 normalization is applied. The code stores a variable called block_number to retrieve the position of a cell in a given block. Finally this normalized histogram of gradients is visualized as shown in Figure (e).