ASSIGNMENT4

DIGITAL IMAGE PROCESSING (DIP) - CSE 478

DEADLINE: 9TH OCTOBER (FRIDAY)

(1) A company that bottles a variety of industrial chemicals has heard of your success solving imaging problems and hires you to design an approach for detecting when bottles are not full. The bottles appear as shown in "bottles.tif" image, as they move along a conveyor line past an automatic filling and capping station. A bottle is considered imperfectly filled when the level of the liquid is below the midway point between the bottom of the neck and shoulder of the bottle. The shoulder is defined as the region of the bottle where the sides and slanted portion of the bottle intersect. The bottles are moving, but the company has an imaging system equipped with a illumination flash front end that effectively stops motion, so you will be given images similar to "bottles.tif". Based on the material you have learned in the class, write a program for detecting bottles that are not filled properly. State all the assumptions that you make and that are likely to impact the solution you propose.

(2) Assume that you have an image capturing system which can grab silhouettes given an image of yoga asanas. Four example images are shown in the folder "yogasan" (namely y1-Ustrasana, y2- veerbhadrasan, y3-vrikhsasana, y4- trikonasana). Write an algorithm (and code it) using region or boundary descriptors to automatically detect which 'asana' is represented in the image. Explain your algorithms and state its limitations (would your algorithm work, if images of more asanas are added in the dataset?)

(3) Take an image of your choice and add gaussian noise to it. Implement a wavelet based denoising algorithm to enhance the degraded image. [Note: One of the simplest approaches is called wavelet shrinkage and the idea is to threshold all high frequency bands (detail bands) using a fixed value and reconstruct back the image. For more advanced solutions, read about SURESHRINK and VISUSHRINK algorithms]

(4) Implement Ripple transform on an image of your choice (Lecture 10, non planar transforms).