Examination Feedback for EEE6219 – Computer Vision
Spring Semester 2015-16

Feedback for EEE6219 Session: 2015-2016

Feedback: Please write simple statements about how well students addressed the exam paper in general and each individual question in particular including common problems/mistakes and areas of concern in the boxes provided below. Increase row height if necessary.

General Comments:

Question 1:

Part (a) was done either really well or really badly. A number of (incorrect) answers misinterpreted the question as being about the Hough transform. Comparatively few identified that the error is bounded by the use-defined threshold; many (incorrectly) suggested noise was the dominant source of error – this may be true for *detection* but by the stage covered in the question, the pixels have already been detected. Not many suggested an application for polygonised edge strings.

Most identified that the task needed to be solved with a Hessian-based detector and, in general, the question was well done. A few people suggested using the Canny edge detection algorithm to detect the outlines of the vessels – although this would not be a preferred technique since it would only work with large diameter vessels, it did receive full marks because the question did not actually specify the dimensions of the vessels! Most identified junctions is the principal problem the tracking although a few also suggested points where vessels cross – this too would be problematic.

Question 2:

A number of answers, while fully answering part (ii), overlooked stating the physical analogy underlying watershed segmentation. Other than that, (a) was generally well answered.

The description of the rolling shutter artefact was generally well done, the only omission being that many people forgot to mention the critical factor that low-cost CMOS sensors readout row-by-row.

(c) This section was, in general very poorly done! Typically, answers failed to identify the inverse relationship between the physical size of a pixel (the sampling aperture) and the frequency response; the key point about the sampling aperture convolving with the image was overlooked. A number of answers misinterpreted the question to mean that the resolution of the image was W x W rather than this being the dimensions of a single pixel. The continuation point about the fill factor of the pixels was similarly poorly done; a number correctly identified that reducing the fill factor would reduce the brightness of the image, but the impact on the frequency response of the image was generally missed.

Question 3:

(a) Reasonably well answered although a number of solutions failed to explicitly identify the Gaussian filtering stage required to remove high-frequency content. In addition, the sub section dealing with the frequency content of the Laplacian pyramid receive some rather vague answers.

(b) This section dealing with the bag of visual words approach was, on the whole, poorly answered. A great many answers discussed template matching, which might be one viable way of matching discrete features but certainly does not constitute the bag of words method itself. Ironically, a number of answers failed to describe the visual bag of words approach were able to identify its fundamental limitation.

(c) By and large, the section on level sets was reasonably well answered.

Question 4:

(a) The aperture problem was reasonably well described apart from a few people who misunderstood the question and thought “aperture” related to the aperture of the lens.

(b) This section was answered generally well.

(c) This section was answered poorly by and large. The description of the basic RANSAC algorithm was typically imprecise. Very few people correctly identified that only two points are necessary in order to fit a straight line under the RANSAC framework. The major disadvantage of the RANSAC algorithm was not identified correctly by the majority – many answers spoke about the problems with outliers. Except overcoming the problem with outliers it is exactly what RANSAC is designed to do! The question on the number of iterations required within the RANSAC algorithm was also badly answered.

Question 5:

Question 6:

Question 7:

Question 8: