Course: Computer vision – CPV301

Practical examination

Duration: 90 minutes

**Submission:**

Submit your file of code (YourName\_YourStudentID.ipynb) and the result (processed images/video).

**Requirements:**

1. You are required to restore the image with mixing texture (IMG\_1.png). It is supposed that you decide to use Fourier transform to remove the texture out of the image. Write a function to do it (built-in fft and ifft are permitted). (3 marks)

2. A customer requires you to stitch 4 images (IMG\_2a.jpg, IMG\_2b.jpg, IMG\_2c.jpg, IMG\_2d.jpg) to generate a panorama image. Write a function which uses stitching techniques to combine them into a larger picture. (2 marks)

3. You are required to segment the following image (IMG\_3.png). You decide to use K-means to segment the image. However, you do not know how to select the best number *K*. One method is to compute the average difference between the segmented image and the original one in terms of intensity (pixel by pixel). Please write the function to calculate that average difference, then test with your segmented images using *K*=2 and *K*=3.

4. The lighting in the following image (IMG\_4.jpg) is insufficient, and the composition could be improved for better balance. You decide to balance it using the “gray world” method. Write a function to implement this method. (2 marks)