ECS795P Deep Learning and Computer Vision, 2020

**Course Work 1: Image Super-resolution Using Deep Learning**

1. Suppose the settings of a SRCNN as: f1=9, f2=3, f3=5, how many pixels of the low-resolution image are utilized to reconstruct a pixel of the high-resolution image with the SRCNN? (10% of CW1)

Answer: (9+5-3)^(2) = 121 pixels

1. Why the deep convolutional model is superior to perform image super-resolution? Give one reason to explain it. (10% of CW1)

Common methods applied to apply filters to images to extract features prior to implementation of Deep Neural Networks, was sparse-coding-based methods where individual features we required to be defined in order to extract particular features where as deep convolutional models perform automatic feature extraction on the input pixels – which allows the model to extract the best performing features without a specific definition of what those features are by the builder of the model.

1. Please explain the physical meaning of peak signal-to-noise ratio (PSNR) in the context of image super-resolution. PS: place here the ground truth (GT) image, and the high-resolution images by SCRNN (HR-SRCNN) and bicubic interpolation (HR-BI) for reference. Also put the PSNR value below the high-resolution images. (10% of CW1)

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| GT |
| HR-BI (PSNR=xx)    PSNR = 20.497630173285614 |
| HR-SRCNN (PSNR=xx)    PSNR = 20.74699299468061 |