

RIT Imaging Science Seminar – 14 February 2018

Speaker: Sophie Triantaphillidou, Ph.D - Computational Vision & Imaging Technology (CVIT), University of Westminster, UK

Title: Visual and imaging performance evaluation using images of natural scenes

Abstract:

The measurement and modelling of **perceived Image Quality (IQ)** is very a vibrant area of research. Numerous new models appear frequently in the literature, all striving to predict the observer impression of the perceived image merit. Such models are relevant, amongst others, to consumer, mobile, security and automotive imaging applications. The talk will first discuss essential 'ingredients' in IQ modeling, from an image engineering perspective. It will then focus on two common spatial models of human vision, often incorporated in modeling IQ: i) the contrast sensitivity function (CSF) that characterizes spatial detection; ii) the contrast discrimination function (or visual perception function, VPF) that characterizes spatial discrimination. Both CSF and VPF are typically measured from simple stimuli (i.e. sine wave, or Gabor functions). Sophie will discuss research carried out in the CVIT labs that derived and modelled CSFs and VPFs using images of real complex scenes, and the merits of such functions. The work employed spatial frequency decomposition, RMS contrast modulation and a psychophysical adaptive staircase method to measure isolated and contextual CSFs (iCSF and cCSF) and VPFs (iVPF, cVPF). Barten's mechanistic model was adapted for modeling the functions, by postulating that, signal detection in a given frequency band, when presented amongst other broadband signals, can be modeled as if amongst noise. Sophie will conclude her talk by outlining a currently project in CVIT, which aims to derive common imaging performance measures, such as the Noise Power Spectrum (NPS) and the Modulation Transfer Function (MTF), using natural scene inputs.