

METHOD FOR RADIANCE APPROXIMATION OF HYPERSPECTRAL DATA USING DEEP NEURAL NETWORK

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We propose a neural network model for calculating the radiance from raw hyperspectral data gathered using a Fabry–Perot interferometer colour camera developed by VTT Technical Research Centre of Finland. The hyperspectral camera works by taking multiple images from different wavelength with varying interferometer settings. The raw data needs to be converted to radiance in order to make any use of it, but this leads to larger file sizes. Because of the amount of the data and the structure of the raw data, the processing has to be run in parallel, requiring a lot of memory and time. Using raw camera data could save processing time and file space in applications with computation time requirements, like target segmentation in medical imaging. Secondly, this kind of neural network could be used for generating synthetic training data or use it in generative models (for example, the generator network in generative adversarial networks). The proposed model approaches these problems by combining spatial and spectral-wise convolutions in neural network with minimizing a loss function utilizing the spectral distance and mean squared loss. The used dataset included images from many patients with melanoma skin cancer.