

Digital image processing operations in the discrete wavelet transform domain

There are numerous international standards and drafts for standards for lossy image compression using the discrete wavelet transform (DWT), so the DWT compressed image format can be a widespread digital image representation format in the near future. In this thesis I propose new, efficient algorithms for the IDWT and other common image processing operations (shift-invariant and variant 2D FIR filtering, edge detection based on 2D FIR filtering, image resampling) which compute the image processed with exactly the given image processing operation directly from the DWT domain data – without performing IDWT. I have implemented the methods proposed for the efficient implementation of the IDWT in the reference software decoder of the recently approved international JPEG 2000 standard.