

This paper concentrates on developing an effective approach for decompressing JPEG document images. Our main goal is targeted to time-critical applications, especially to those situated on mobile network infrastructures. To this aim, the proposed approach is designed to work either in the transform domain or image spatial plane. Specifically, the image blocks are first classified into smooth blocks (e.g., background and uniform regions) and non-smooth blocks (e.g., text, graphics, and line-drawings). Next, the smooth blocks are fully decoded in the transform domain by minimizing the total block boundary variation, which is very efficient to compute. For decoding non-smooth blocks, a novel text model is presented that accounts for the specifics of document content. In addition, an efficient optimization algorithm is introduced to reconstruct the non-smooth blocks. The proposed approach has been validated by extensive experiments, demonstrating a significant improvement of visual quality, assuming that document images have been encoded at low bit rates and thus are subject to severe distortion.