Staff removal using image operator learning

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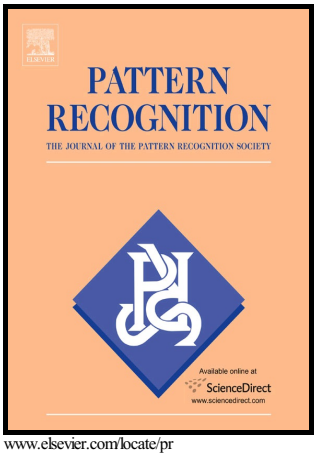

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Abstract

Staff removal is an image processing task that aims to facilitate further analysis of music score images. Even when restricted to images in specific domains such as music score recognition, solving image processing problems usually requires the design of customized algorithms. To cope with image variabilities and the growing amount of data, machine learning based techniques emerge as a natural approach to be employed in image processing problems. In this sense, image operator learning methods are concerned with estimating, from sample pairs of input-output images of a transformation, a local function that characterizes the image transformation. These methods require the definition of some parameters, including the local information to be considered in the processing which is defined by a window. In this work we show how to apply the image operator learning technique to the staff line removal problem. We present an algorithm for window determination and show that it captures visual information relevant for staff removal. We also present a reference window set to be used in cases where the training set is not sufficiently large. Experimental results obtained with respect to synthetic and handwritten music scores under varying image conditions show that the learned image operators are comparable with especially designed state-of-the-art heuristic algorithms.

Keywords: staff removal, optical music recognition, document image analysis, image operator, machine learning