Restoration of Old Motion Pictures Using Nonlinear Digital Image Processing Techniques

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Abstract

Most of old motion pictures produced before the fifties have a very short life span. They are in a very bad condition and they continue to deteriorate. Hence, it is necessary and urgent to restore and preserve them before we lose them. This thesis presents a restoration algorithm for old motion black and white pictures based on the use of a Rational Filter (RF) which has recently been proposed as a nonlinear filter to represent the input-output relation in a nonlinear signal processing system. In this restoration algorithm, we are trying to retrieve back the information which was lost in the damaged regions on the image using an RF. Here we assumed that the information about the location and the size of defects is known and only we are interested in the usage of this information to do the restoration. The contributions of this thesis are: The restoration algorithm is working in the spatial domain which reduces the time needed to do the restoration and the cost as well. The restoration algorithm is extended to cover the color scale using a Vector Rational Filter (VRF) which is considered as a straight forward application of the RF. Later, this thesis slightly covers the detection algorithm of one type of defects which is vertical scratches using a connection operator in the spatial domain.