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Authors:
Dhafer R

Mohammed Ali Tawfeeq

Ihab Ibrahim Kadhim

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Abstract

In the last years the development in digital image acquisition, capturing, processing and displaying devices is one of the fastest growing fields. Most of these devices introduce some amount of geometric lens deformation and cause uncorrected dimensions in displaying the objects, such as cameras, scanners, lenses, and mirrors. This type of deformation is main issue in computer vision and in many image analysis systems, thus the availability of accurate image positional information is requisite. This work introduces a general algorithm use to correct the images deformed by a fixed and known properties system. A simple prototype system (convex mirror with digital camera) has been constructed, in which the mirror and the camera are well positioned to each other to capture any required reflected scene or image. The idea of the proposed algorithm is based on selecting an original image, capturing its reflection, and then obtaining the deformed ratios for each row and column between the captured image and the original image. These ratios represent the raw components to what referred here as the deformation-map. This map is assumed to be a general pattern for the proposed prototype system, to be used later in correcting the deformed images. The correction process depends mainly on three operations; stretching-padding-cropping. In the first operation, each row and

column is stretched to a length depends on the corresponding compression ratio's element in the deformation-map. The second operation modifies the size of the image by adding pad array to the end sides, while the third operation crops the image to the required size. The values of the expanded pixels are computed using some interpolation method. Very satisfactory correction results have been obtained using the extracted deformation-map. Moreover, it is found that this map can be applied to correct deformed grayscale, RGB, and binary images.

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Index Terms

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Keywords

Convex mirror Deformed image Corrected image Deformation-Map.