

Digital Identification and Reconstruction of Degraded Regions in the Ancient Temple Murals Using Exemplar Based Region Filling Algorithm

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Research

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Abstract

A mural is any piece of artwork sculpted or applied directly on a wall, ceiling, or other permanent surfaces. This artwork symbolizes various cultures, traditions, historical events, spiritual stories, and civilizations of respective societies of ancient times. But these mural paintings are subjected to degradation either by various natural causes as well as pollution or by human beings without knowing its value. Hence, there is a need to develop a digitized model using advanced image processing techniques to reconstruct them for portraying the ancient heritage and wisdom hidden in the temple mural paintings to public and foreign visitors and transferring the knowledge to the young generations. This Work uses an exemplar-based region filling algorithm for the reconstruction of ancient deteriorated temple murals. Most of the existing inpainting algorithms use pixel-based reconstruction criteria, this type of technique does not work well for images with large degraded portions. So the proposed exemplar-based region filling algorithm uses a patch-based reconstruction procedure and masked images are created automatically using an averaging pixel algorithm. The deteriorated portions are identified by creating masks, masks are created in such a way that degraded portions have a pixel intensity value of one and the remaining part has a value of zero, and filling is done by analyzing the surrounding pixel values of the degraded pixel. The proposed work reconstructs both the structure and texture information and ensures an efficient reconstructed result compared to existing inpainting techniques. The system performance is evaluated by metrics such as Mean Square Error, Peak Signal To Noise Ratio (PSNR), and Structural Similarity Index(SSIM).

Full Text

This preprint is available for [download as a PDF](#).

Figures



(a)



(b)



(c)

Figure 1

Sample Temple Mural Images

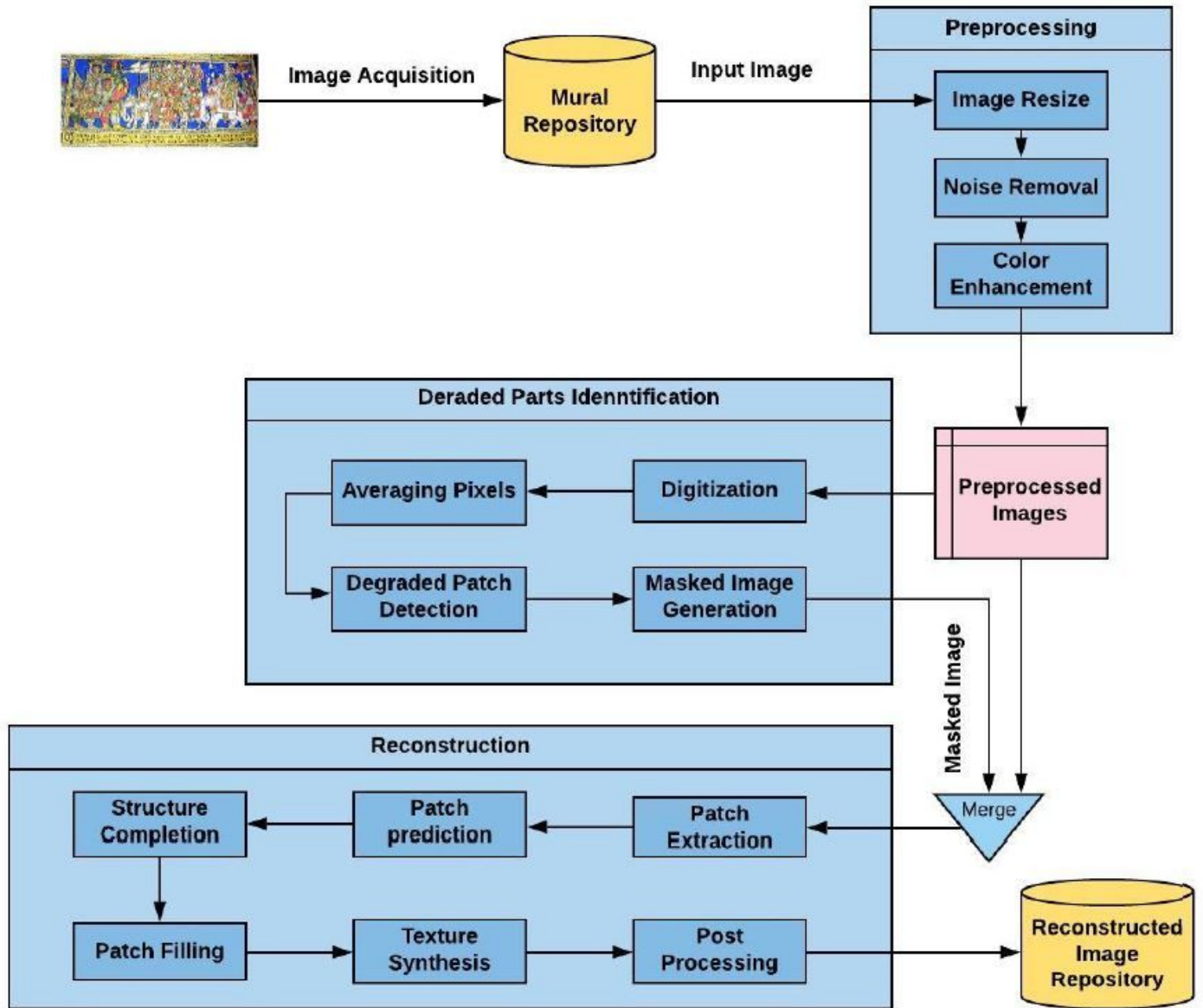


Figure 2

Diagram illustrating the steps involved in the reconstruction of ancient temple murals.

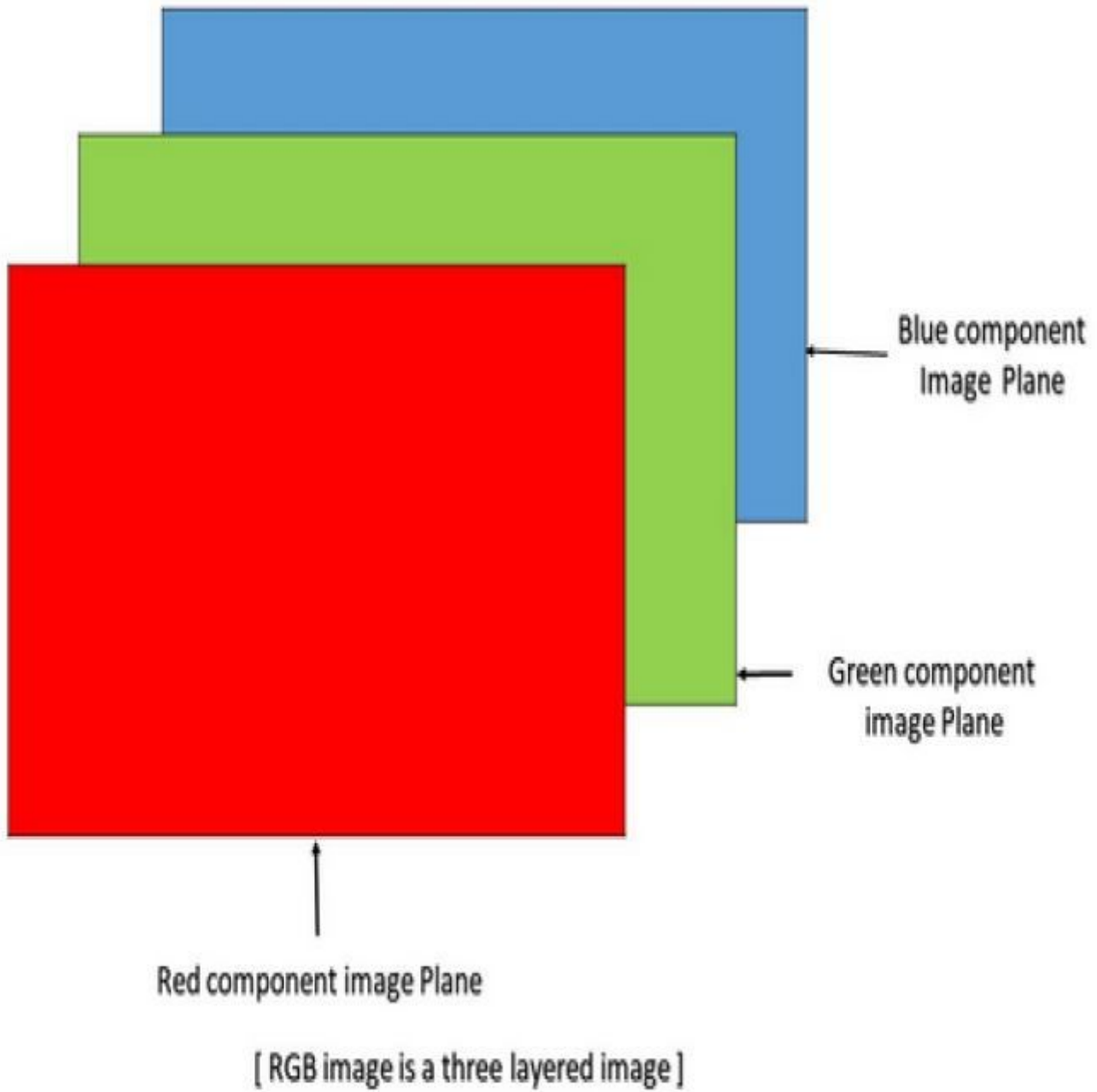


Figure 3

rgb image

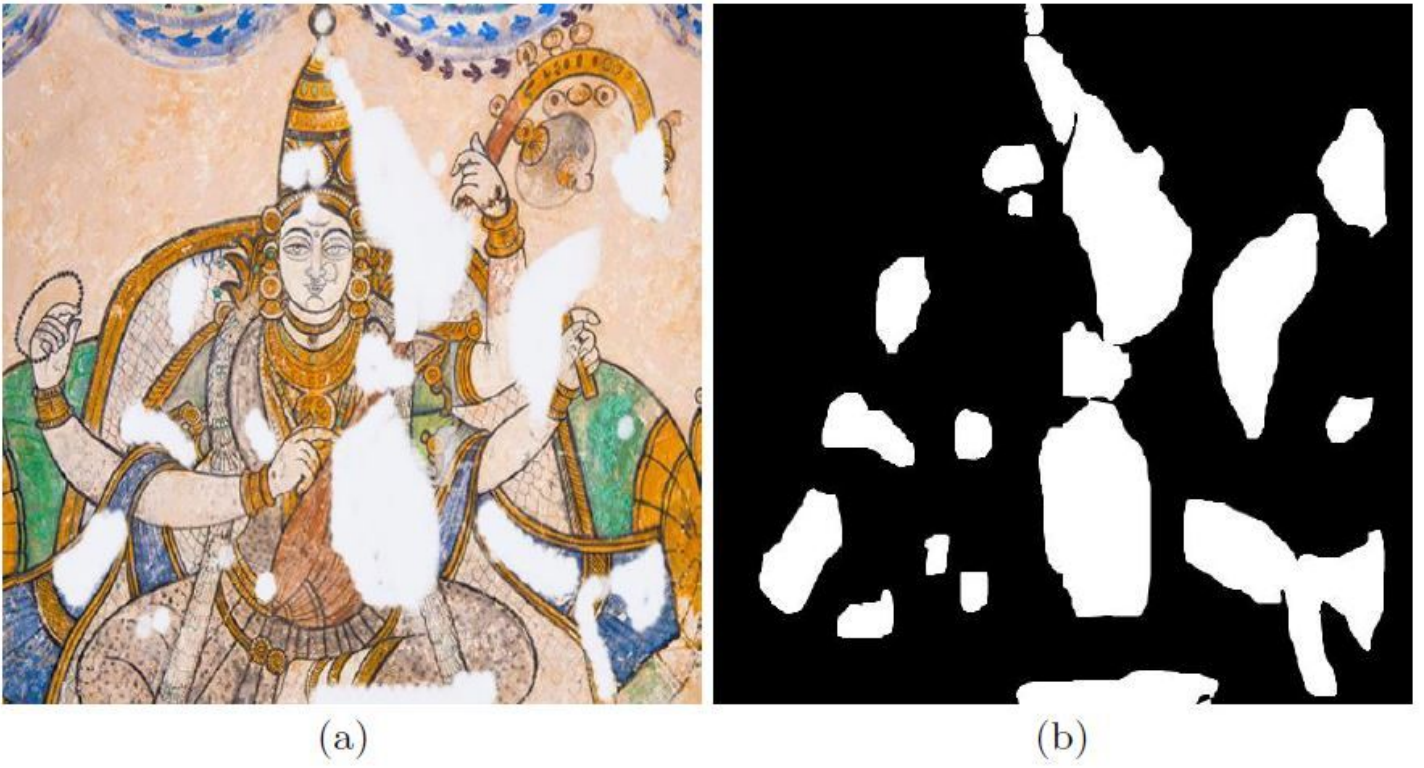


Figure 4

a depict the Degraded mural Images and Figure 4b represent it masked image.

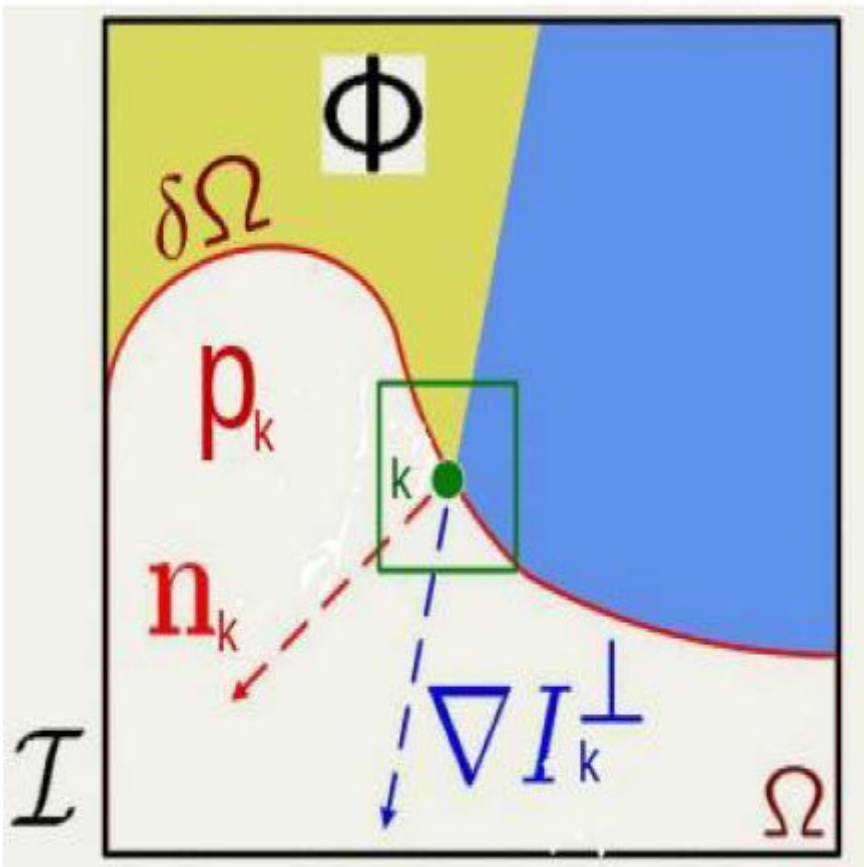


Figure 5

Notation diagram



Figure 6

Figure 6 itself notify that the proposed system provides an efficient and effective reconstruction result in terms of structure, texture, and color.