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| | Nota di contenuto | 1. Introduction -- 1.1 What is super-resolution? -- 1.2 What is inpainting? -- 1.3 Applying super-resolution and inpainting in digital heritage images: challenges and solutions -- 1.4 A tour of the book -- 2. Image super-resolution: self-learning, sparsity and Gabor prior -- 2.1 Single-image SR: a unified framework -- 2.1.1 Classical (within-scale) super-resolution -- 2.1.2 Exampled-based (across-scale) super-resolution -- 2.1.3 Unifying classical and example-based SR -- 2.2 Self-learning and degradation estimation -- 2.3 Gabor prior and regularization -- 2.4 Performance evaluation -- 2.4.1 Qualitative evaluation -- 2.4.2 Quantitative evaluation -- 2.5 Conclusion -- 3. Self-learning: faster, smarter, simpler -- 3.1 Efficient self-learning -- 3.1.1 Improved self-learning for super-resolution -- 3.2 Performance evaluation -- 3.2.1 Perceptual and quantitative evaluation -- 3.2.2 Improvements and extensions -- 3.3 Conclusion -- 4. An exemplar-based inpainting using an autoregressive model -- 4.1 Limitation of existing approaches -- 4.2 Proposed approach -- 4.3 Experimental results -- 4.4 Conclusion -- 5. Attempts to improve inpainting -- 5.1 A modified exemplar-based multi-resolution approach -- 5.1.1 Refinement by matching a larger |

**Sommario/riassunto**

Heritage sites across the world have witnessed a number of natural calamities, sabotage and damage from visitors, resulting in their present ruined condition. Many sites are now restricted to reduce the risk of further damage. Yet these masterpieces are significant cultural icons and critical markers of past civilizations that future generations need to see. A digitally reconstructed heritage site could diminish further harm by using immersive navigation or walkthrough systems for virtual environments. An exciting key element for the viewer is observing fine details of the historic work and viewing monuments in their undamaged form. This book presents image superresolution methods and techniques for automatically detecting and inpainting damaged regions in heritage monuments, in order to provide an enhanced visual experience. The book presents techniques to obtain higher resolution photographs of the digitally reconstructed monuments, and the resulting images can serve as input to immersive walkthrough systems. It begins with the discussion of two novel techniques for image super-resolution and an approach for inpainting a user-supplied region in the given image, followed by a technique to simultaneously perform super-resolution and inpainting of given missing regions. It then introduces a method for automatically detecting and repairing the damage to dominant facial regions in statues, followed by a few approaches for automatic crack repair in images of heritage scenes. This book is a giant step toward ensuring that the iconic sites of our past are always available, and will never be truly lost.