



list

Laboratoire d'intégration des systèmes et des technologies
Département Imagerie Simulation et Contrôles

SUJET MASTER

Restoration for 3D image in tomography

Description

Inpainting based restoration methods have been developed for image restoration in computer vision. In the framework of X-ray imaging, for medical imaging, non-destructive testing or material science, these methods can be applied for different purposes, such as the reduction of artifacts due to high contrast components in the object, the missing data or as a method to reduce the dose delivered to the human body during the exam. An example is given in fig. 1.

Objectives

This works will focus on inpainting methods applied to the X-ray imaging field, including computed tomography.

In a first phase, existing methods will be evaluated, which should lead to a best choice for our application. In the second phase a C++ code should be implemented and optimized. The last part will consist of code validation on synthetic and experimental data.

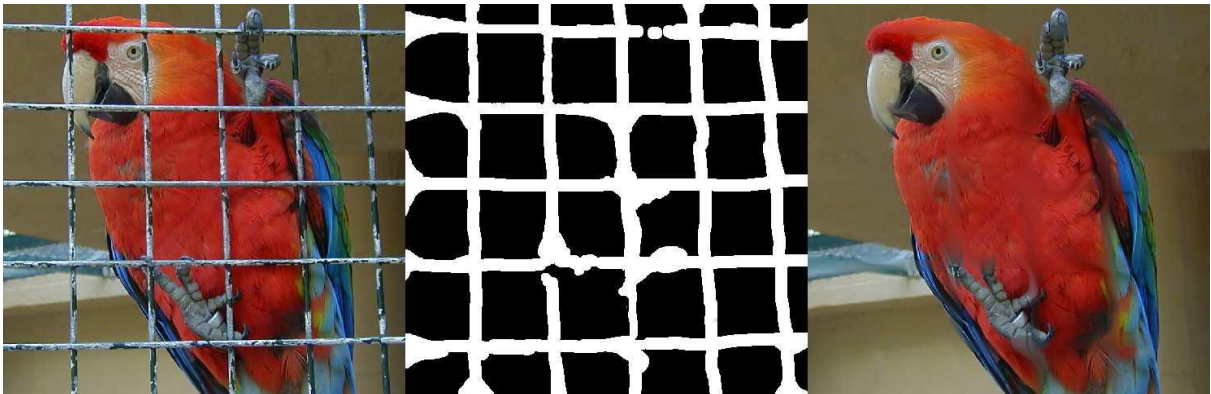


Fig 1. From left to right : original image, binary mask and restored inpainting image (from David.Tschumperle@greyc.ensicaen.fr)

Reference:

- <http://cimg.sourceforge.net/greycstoration/>
- Tony F. Chan, Michael K. Ng, Andy C. Yau, Andy M. Yip, Superresolution image reconstruction using fast inpainting algorithms Original Research Article Applied and Computational Harmonic Analysis, Volume 23, Issue 1, July 2007, Pages 3-24

Key words: tomography, image processing, physics

Computer language: C++ or Matlab

Main skills: computer science, numerical methods, modeling, optimization

Term : 3-4 mois

Lab : CEA LIST, Saclay (20 km SE of Paris)

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