Programa de Pós-graduação em
INFORMÁTICA

PUC Minas

Graph-based image processing

— Overview —

(Professor version)

Silvio Guimarães

Graduate Program in Informatics – PPGINF
Image and Multimedia Data Science Laboratory – IMScience
Pontifical Catholic University of Minas Gerais – PUC Minas

Aug 2022

Acknowledgement

Thanks to the Prof. Jean Cousty at ESIEE/France that gently sent me the slides used in the Morpho, Graph and Image course. Some slides of the Graph-based Image Processing course at PPGINF/PUC Minas under supervision of Prof. Silvio Guimarães will be adapted versions of that course.

- Course - MorphoGraph and Imagery
  https://perso.esiee.fr/ coustyj/EnglishMorphoGraph/
- Jean Cousty
  - ESIEE Paris, Département Informatique
  - Université Paris-Est, LIGM (UMR CNRS, ESIEE...)
  - E-mail: `j.cousty@esiee.fr`

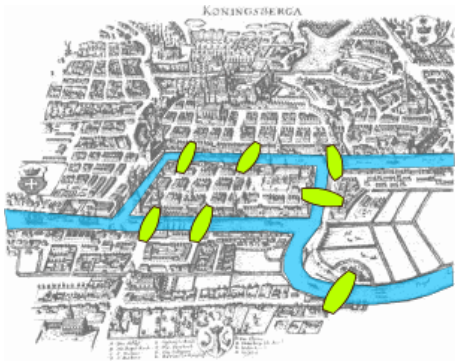
Organization

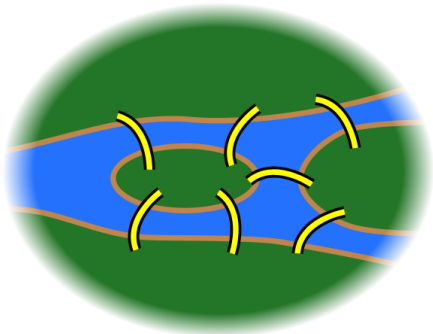
- Instructor
  - Silvio Guimarães, Sala L305, PUC Minas, sjamil@pucminas.br
  - Office Hours: 08am–04pm Mondays and Wednesdays
- Course information
  - Lectures: 30h
  - Evaluation could be:
    - Theoretical exam (2h)
    - Report and talk of a subject related to graph-based image processing
- Class meeting time
  - To be decided
- Homepage
  - To be defined

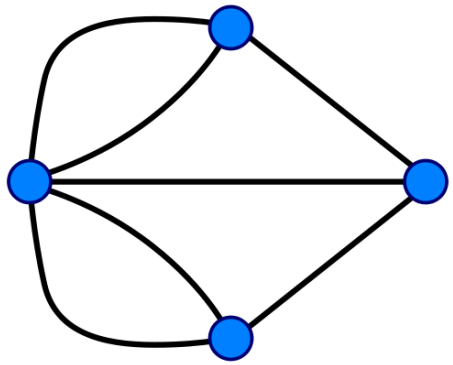
Graphs

Graphs (source wikipedia)

- Graph theory is an informatics and mathematic theory. The algorithms designed to solve problems concerning objects of this theory have numerous applications in all fields linked to the notion of a network (social network, computer network, telecommunication network . . .) and in many other fields (i.e. genetic). Some important and difficult theorems, such as the "four colors theorem", make this theory recognized
- Origin: The 7 bridges of Königsberg (Leonhard Euler, 1735)





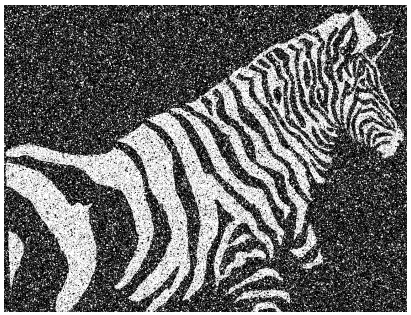


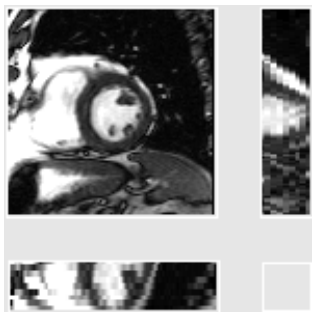
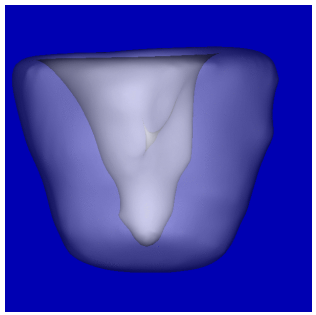
Mathematical Morphology

Mathematical Morphology (source wikipedia)

- Mathematical morphology (MM) is a theory and a technique for the analysis and the processing of geometrical structures. It is based on set theory, lattice theory, topology, and random functions.
- MM development was inspired by problems of image processing, which is its main field of application. MM gives in particular tools for filtering,

- Origin: G. Matheron & J. Serra (1966)



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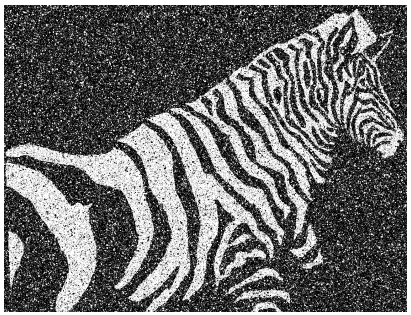

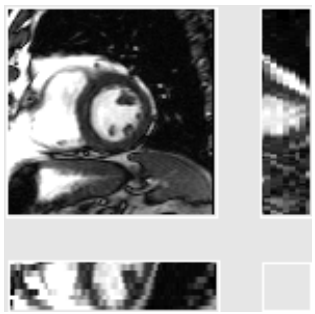
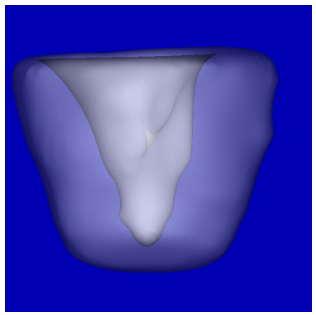

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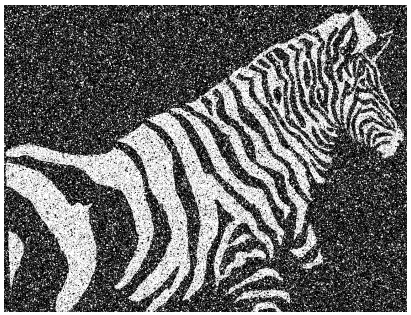

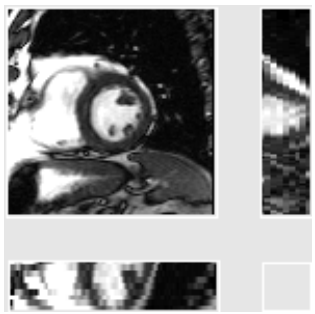
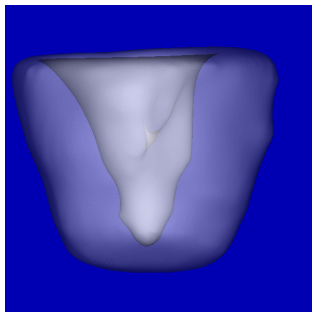

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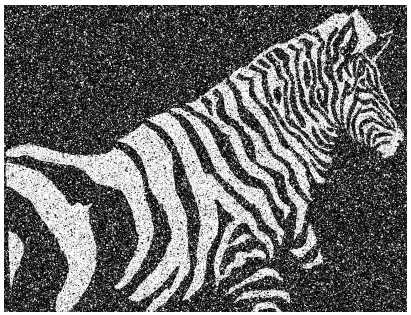

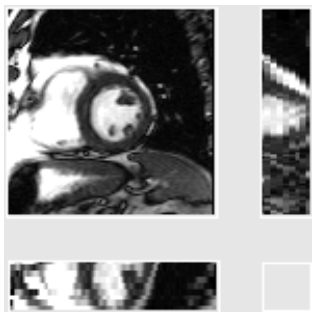
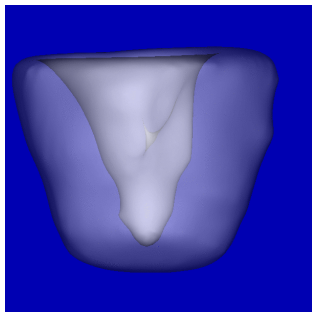
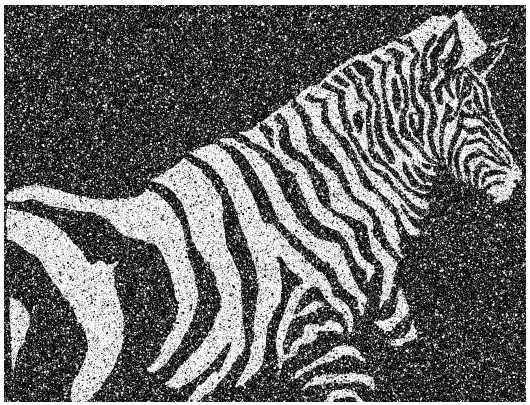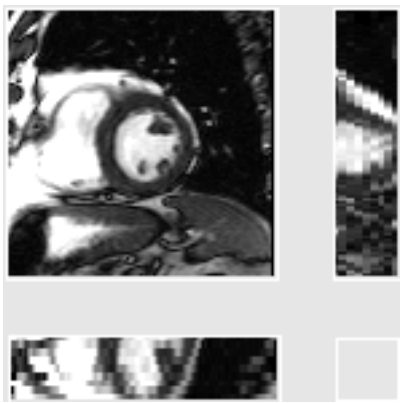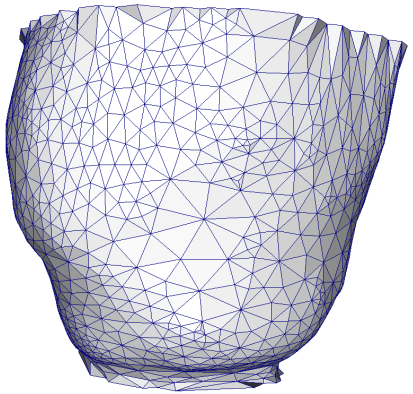
Imagery