Mathematical Preprint Servers

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Preprint Server

- What is a Preprint server?
  - Internet repository of preprints
  - Electronic journals and Preprint servers
    - The copyright problem
  - Digital libraries
- Some preprint servers
  - Ncstrl: http://www.ncstrl.org
  - Topology Atlas: http://www.unipissing.ca/topology/

Preprint Server

- Database
  - Store preprints
    - Content design
    - Content generation
  - Deliver preprints
    - User access
    - Internet

Preprint Server

- Content Design
  - Use a Database Manager?
  - Files and Folders Structure
  - Types of data
    - text,
    - images,
    - video,
    - audio, etc.

Types of Data

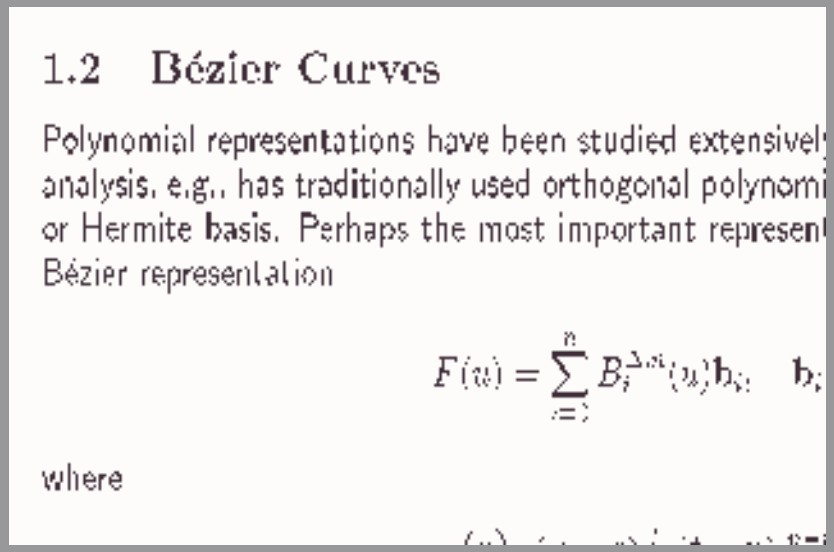
- File formats
  - for papers
    - html
    - Acrobat PDF
    - Postscript
  - For images
    - JPEG,
    - GIF,
    - FlashPix, ...
  - For video
    - MPEG,
    - Real Video, ...

Preprint Server

- Content generation
  - For papers
    - LaTex + Illustrating software
      - DVI format
      - Postscript generator (dvips)
      - PDF generator (Acrobat Distiller)
      - Html (Latex2html)
  - Cataloging
    - Indexing and search keys
      - Author, title, etc.

Content generation

- PDF & LaTeX
  - Scalable x bitmap fonts

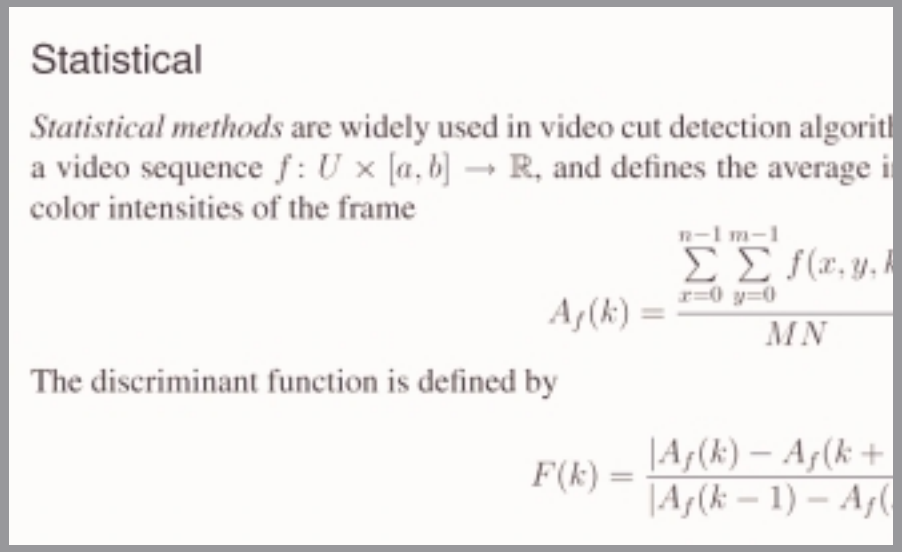


1.2 Bézier Curves

Polynomial representations have been studied extensivel
analysis, e.g., has traditionally used orthogonal polynomi
or Hermite basis. Perhaps the most important represen
Bézier representation

$$F(u) = \sum_{i=}^{n} B_i^{\lambda,\alpha_i}(u)\mathbf{b}_i; \quad \mathbf{b}_i$$

where



Statistical

Statistical methods are widely used in video cut detection algorit
a video sequence $f : U \times [a, b] \to \mathbb{R}$, and defines the average i
color intensities of the frame

$$A_f(k) = \frac{\sum_{x=0}^{n-1}\sum_{y=0}^{m-1} f(x, y,}{MN}$$

The discriminant function is defined by

$$F(k) = \frac{|A_f(k) - A_f(k+}{|A_f(k-1) - A_f($$

Preprint Server

- Access
  - Types of access (How?)
    - querying
    - browsing
  - Access Permissions (Who?)
    - Restricted
      - Using domain
      - Using password
    - Non-restricted
  - Access location (Where?)
    - Local or distributed

Access

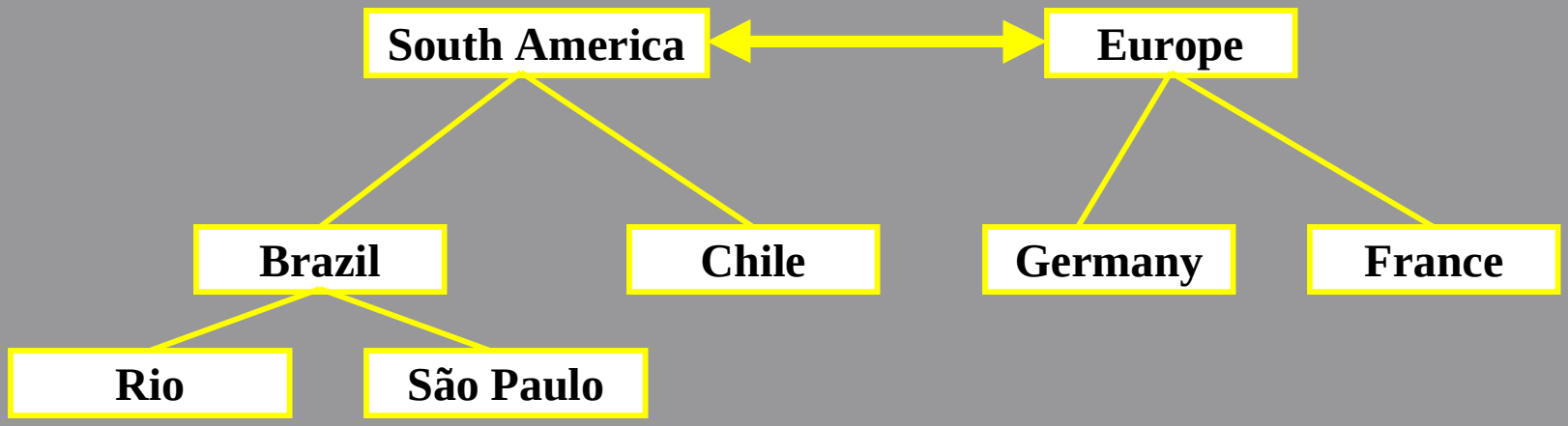
- Distributed Preprint servers
  - Decentralized servers
  - Network of database servers
  - More efficient and flexible
  - Internet based
    - Client-Server paradigm
    - Distributed Web Servers
    - Client: WWW Browser (e.g. Netscape)
  - Topology of the server connections

Distributed Preprint Servers

- Hierarchy
  - Graph topology
    - e.g. Tree hierarchy
  - Reduce data replication
    - Metadata x full text
- Mirrors
  - Full replication of data
    - Data redundancy
    - Waste of computational resources
    - Avoids the network traffic

Distributed Preprint Servers

- Ideal scenario
  - Hybrid architecture
    - Hierarchy of distributed preprint servers
    - metadata and mirrors



Preprint Server Characteristics

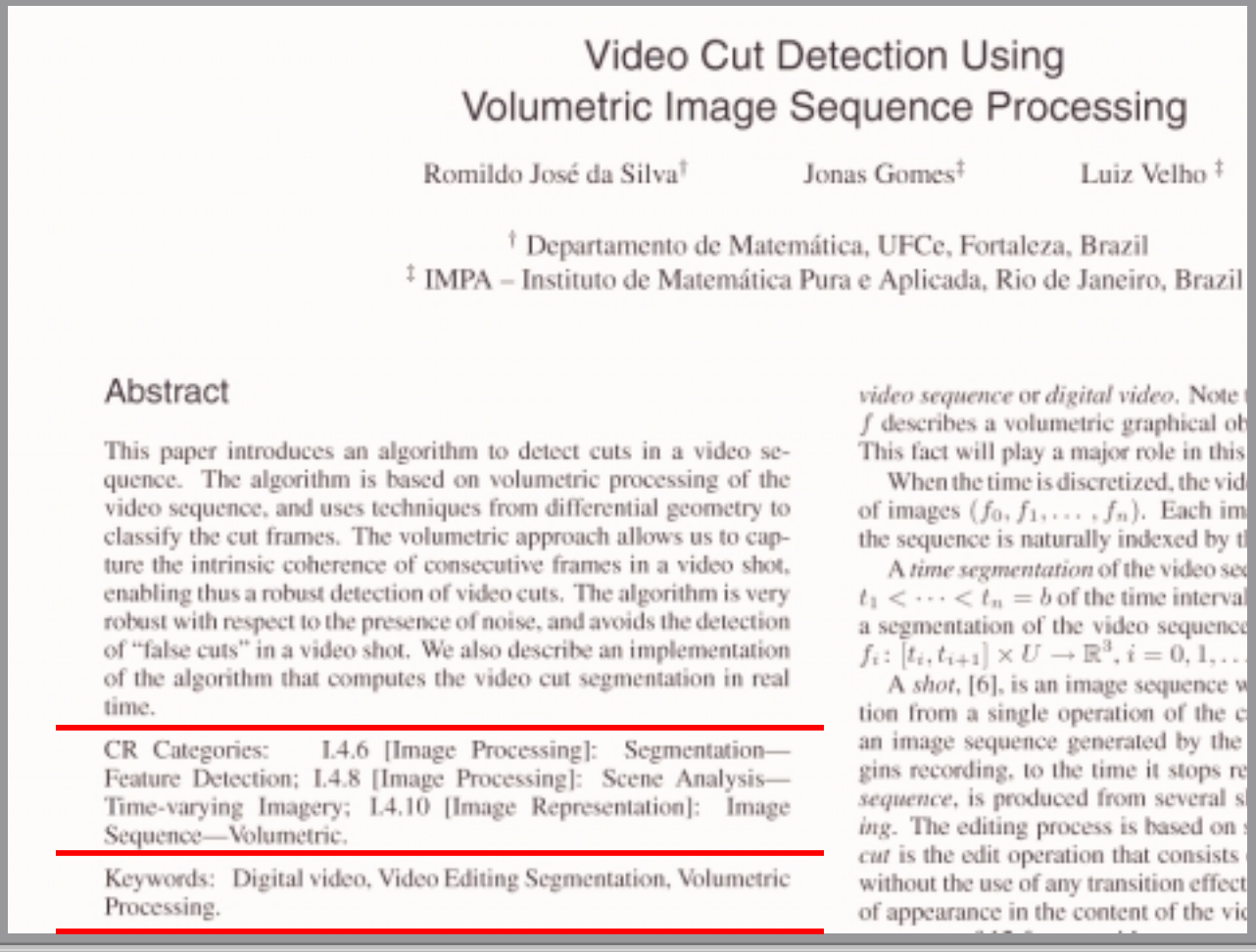
- Simple and cheap structure
  - Files and Folders
- Type of data
    - text, hypertext, images, video, audio, etc.
  - File formats for papers
    - html
    - Acrobat PDF
    - Postscript
- Distributed with mirrors
- Metadata

Metadata for Cataloging

- Structured content
  - More information with less data
- Standardized Metadata
  - Library paradigm
    - title, author etc.
  - Abstract,
  - Keywords,
  - Subject classification

Subject classification

- ACM subject classification



Video Cut Detection Using
Volumetric Image Sequence Processing

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Abstract

This paper introduces an algorithm to detect cuts in a video sequence. The algorithm is based on volumetric processing of the video sequence, and uses techniques from differential geometry to classify the cut frames. The volumetric approach allows us to capture the intrinsic coherence of consecutive frames in a video shot, enabling thus a robust detection of video cuts. The algorithm is very robust with respect to the presence of noise, and avoids the detection of "false cuts" in a video shot. We also describe an implementation of the algorithm that computes the video cut segmentation in real time.

CR Categories: I.4.6 [Image Processing]: Segmentation—Feature Detection; I.4.8 [Image Processing]: Scene Analysis—Time-varying Imagery; I.4.10 [Image Representation]: Image Sequence—Volumetric.

Keywords: Digital video, Video Editing Segmentation, Volumetric Processing.

video sequence or *digital video*. Note
f describes a volumetric graphical ob
This fact will play a major role in this

When the time is discretized, the vid
of images $\{f_0, f_1, \ldots, f_n\}$. Each im
the sequence is naturally indexed by t

A *time segmentation* of the video se
$t_1 < \cdots < t_n = b$ of the time interval
a segmentation of the video sequence
$f_i : [t_i, t_{i+1}] \times U \to \mathbb{R}^3$, $i = 0, 1, \ldots$

A *shot*, [6], is an image sequence w
tion from a single operation of the c
an image sequence generated by the
gins recording, to the time it stops re
sequence, is produced from several s
ing. The editing process is based on
cut is the edit operation that consists
without the use of any transition effect
of appearance in the content of the vi

Subject classification

- Subject Classification
  - MSC - Mathematical Subject Classification
    - http://www.ams.org
  - ZDM - Zentralblatt
    - http://www.emis.de/ZMATH/
  - CR - ACM Computing Classification
    - http://www.acm.org
  - PACS - Physics and Astronomy Classification
    - http://www.publish.aps.org/PACS/pacsgen.html

Preprint Server

- Standardization
  - Scalability
  - Reduction costs
    - Installation
    - training
    - maintenance
  - Worldwide usability

Preprint Server

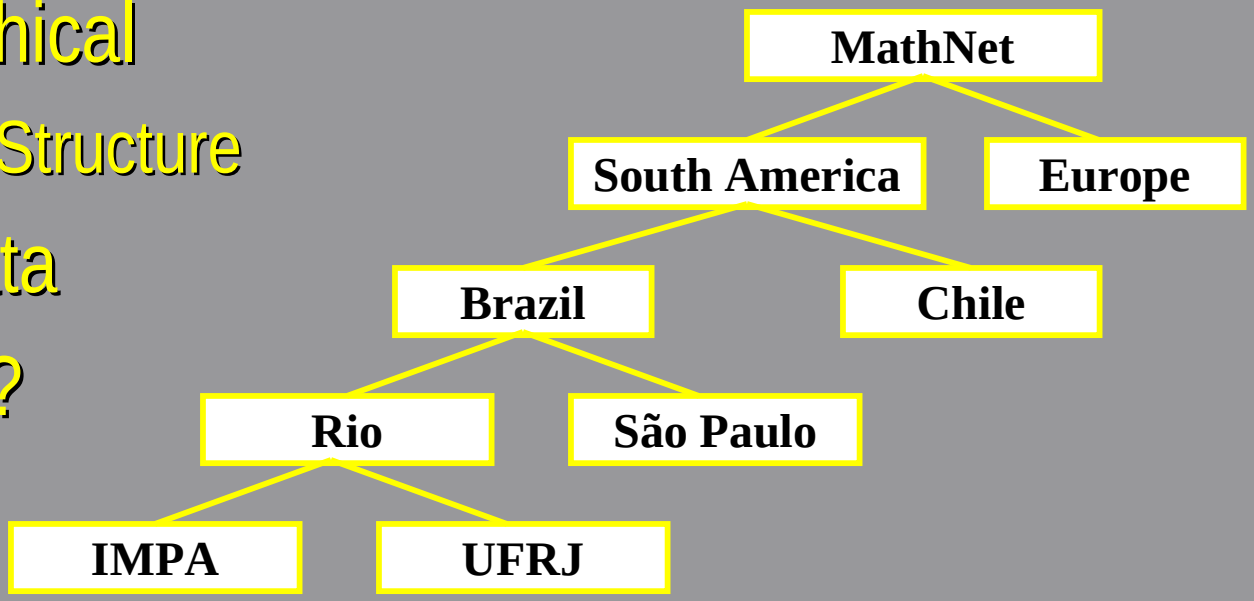
- Computer platform
  - Hardware
    - PC computer
    - Sun
    - Alpha digital
    - etc.
  - Operating system
    - Windows NT
    - Linux
    - SunOS

The IMU Initiative

- International Mathematical Union (IMU)
  - http://www.impa.br/imu/
- CEIC committee
  - The Future of Mathematical Communication
  - http://www.cgtp.duke.edu/CEIC/
- MathNet Project
  - Preprint Servers
    - Papers, People, Departments, Institutes, etc.
- Free access policy

MathNet Project

- Distributed
- Internet based
- Hierarchical
  - Tree Structure
- Metadata
- Mirrors?



MathNet Software Suite

- Cataloging Software
  - Who does the cataloging?
  - User Interface
- Collecting software
  - Metadata
- Web Server

MathNet in Brazil

MathNet in Brazil

- IMPA, IME-USP
  - New partners are welcomed
- MathNet at IMPA
  - Installation
  - Development
  - Distribution
  - Training

IMPA Preprint Server

- Visgraf Laboratory
  - papers and thesis database
  - http://www.visgraf.impa.br/publications.html
- IMPA Preprint Server
  - Under installation
  - Follow MathNet standardization
    - Collaboration with Germany and France
  - http://www.preprint.impa.br
  - preprint@impa.br

IMPA Preprint Server

- Team
  - Margareth Prevot
  - Cecília Chataignier
  - Roberto Beauclair

IMPA Preprint Server

- Intel-based computer
- Linux operating system
- Apache Web Server
- Harvest
  - collecting Software
- Database
  - directories organized *by years*
  - filenames pattern : *series + number*

Join MathNet

- MathNet
  - http://www.math-net.de
  - http://mathnet.preprint.org
- IMPA
  - http://www.impa.br/mathnet/
  - mathnet-l@impa.br
- Brazilian domain for MathNet
  - Under discussion in the CEIC