ROI-based procedures for progressive transmission of digital images: A comparison

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Progressive transmission of digital images

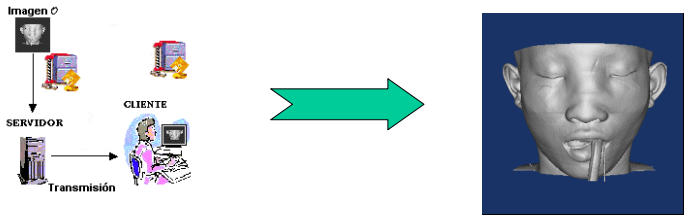
Large images

- Large digital images
  - Astronomy images
  - Satellite images
  - Medical images
    - Magnetic Resonances or 3-D ultrasound scans
- Large digital images have problems for
  - Storing, encoding, manipulating
  - Transmission

Progressive transmission of digital images

Sequential methods

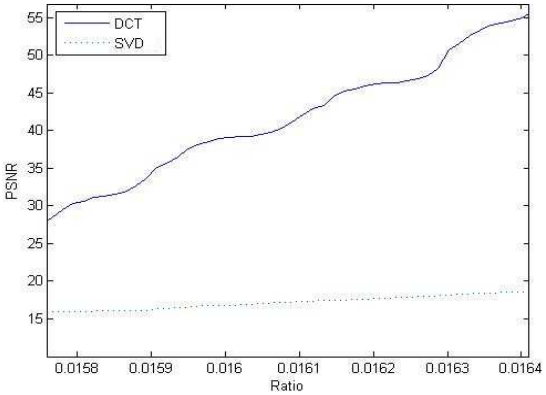
- The usual methods for progressive transmission are “sequential”
  - Until the transmission is finished the transmitted image can not be seen.
- The transmission channel could become slower or jammed.



Experiment 2

SVD versus DCT

- **DCT is better than SVD.**



Conclusions (I)

- **Situation 1: The ROIs are known *a priori*.**
  - Comparison SVD – MAXSHIFT
  - JPEG 2000 is the best method known for whole images.
    - Only a ROI is allowed.
    - If the client change the ROI, the whole image should be encoded again and the transmission should be re-started from the beginning.
    - Redundancy and data interlaced are the main drawbacks of this method.
  - The SVD encoding increases the amount of data. Quantization can save this drawback but losing image quality.
    - Several ROIs at same time are allowed.
    - Data redundancy is avoided.
    - The encoding is done only once.
  - **Both methods are comparable at low ratios.**

Conclusions (II)

- **Situation 2: The ROIs are selected during the progressive transmission.**
  - Comparison SVD – DCT
  - DCT is a good method for progressive transmission of ROIs.
    - The DCT method proposed encodes the image increasing the resulting size.
    - Pixellation is observed at first step of transmission.
    - Reconstruction is carried out with inverse DCT at each step and consequently, it leads to a high computational cost.
  - At firsts steps, the reconstructed ROIs are smoother than the corresponding to DCT.
  - **DCT method is better than SVD method.**

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