DCU-SAVASA
Participation and Reflections

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- FP7 project
- Started in December 2011
- 30 months
- 11 participants
- 5 countries
The SAVASA project

• Proposes the creation of a **video archive search platform** that allows authorized users to perform **semantic queries** over various remote and non-interoperable surveillance video archives.

• Exploits the current research trends in computer vision, video retrieval and semantic video analysis.
SAVASA participation in SIN 2013

• First participation of SAVASA in SIN
• Goals
  – Explore the quality of a common state-of-the-art approach for video retrieval (proof of concept)
  – Discover the requirements for building video semantic indexing tools
  – Identify the future directions that should be followed
SAVASA participation in SIN 2013

Features
1. hg104 (IRIM-MRIM)
2. OppSift 1000 (IRIM-MRIM)

Classification
• SVM-RBF kernel (Euclidian distance)

Training
• 2 fold cross-validation (Train/Val sets)
• Careful exploration of training parameters
SAVASA participation in SIN 2013

Results
- Average results with only two features (weighted late fusion)
- Careful exploration of parameter values can lead to good results
- 3 desktop machines (4 threads each) and one laptop (2 threads)
- Processing time $\approx 6000$ PCH, excluding keyframes extraction and features extraction
SAVASA participation in SIN 2013

• Overall Mean InfAP
  – IRIM-MRIM Hg104: 0.0722
  – IRIM-MRIM Opp_sift.dense_1000: 0.1165
  – Weighted late fusion: 0.1320
Reflections and questions

• SIN-like tasks are becoming a joint research-engineering challenges

• No magical solution!
  – The use of multiple descriptors and multiple classification methods is unavoidable! (?)

• Very high entry barrier for new participants
  – Can we lower the entry barrier?
  – Providing descriptors by IRIM was very helpful and time saving, thank you!
  – Can we do similar initiatives for training?
Reflections and questions

• What do we need to do?

Will we keep on moving forward in all directions?
Reflections and questions

Number of Descriptor

# Descriptors
Processing time
Results quality

Training parameters tuning

Parameters tuning
Processing time
Results quality

Detailed tuning
No tuning

10/11/2013
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Reflections and questions

- More focus need to be done on the hardware infrastructure
- Feature extraction can be a centralised task?
  - To promote classification research
- Classifiers can be provided?
  - To promote fusion research
Reflections and questions

• If the hardware infrastructure is a solved problem in the future, on what we have to focus now?

• Using very advanced infrastructure can solve some problems but is it feasible in real-life scenarios (e.g. CCTV analysis companies)
  – Reformulating some questions: How well can we achieve with X core, and Y hours?
DCU’s framework for visual big data processing (2014)

**Low level processing**
- Color adjustment
- Segmentation
- Key-frame extraction

**Visual feature tools**
- Feature extraction
  - Video feature extraction
  - Still images feature extraction
- Feature processing
  - PCA, Clustering, LSI, BOVW, Normalisation, ...

**Manual annotation Tools**
- Annotation per frame/image
- Annotation per object
- Annotation per video segment

Images
Videos
DCU’s framework for visual big data processing (2014)

**Machine learning**
- Discriminative learning
  - SVM, Neural networks, logistic regression, Boosting
- Generative learning
  - GMM, Hidden Markov model, LDA, Naive Bays

**High level semantic extraction**
- Object/Scene classification
- Object recognition/localisation
- Face recognition
- Person identification ....

**Retrieval and matching**
- Query by keyword or by content
- Visual features/descriptor matching
  - RANSAC, distance metrics

20/11/2013
DCU’s framework for visual big data processing (2014)

- The framework will be hosted in the servers of The Irish Centre for High-End Computing (ICHEC)

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<th>Class A “High Impact”</th>
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Thank you!