

# JRS at Event Synchronisation Task

Paweł Nowak, Marcus Thaler, Harald Stiegler, Werner Bailor

## Approach

JOANNEUM RESEARCH  
Forschungsgesellschaft mbH

DIGITAL  
Institute for Information and  
Communication Technologies

Steyrergasse 17  
8010 Graz, Austria

Tel. +43 316 876-5000  
Fax +43 316 876-5010

digital@joanneum.at  
www.joanneum.at/digital

### Determine time offsets

- Determine the visual similarity of image pairs
- Based on full matching of SIFT descriptors and VLAD
- For a pair of images  $(I_i, I_j)$

- SIFT similarity  $s_{ij}^S$  is determined as

$$s_{ij}^S = \begin{cases} \max(0, \frac{|P_{ij}|}{\min(|P_i|, |P_j|)} - \theta_S), & \text{if } |P_{ij}| \geq p \\ 0, & \text{otherwise,} \end{cases}$$

- VLAD yields distances  $d_{ij}^V$ , which are transformed into similarities

$$s_{ij}^V = \begin{cases} \theta_V - d_{ij}^V, & \text{if } d_{ij}^V < \theta_V \\ 0, & \text{otherwise,} \end{cases}$$

- All similarities above zero used
- GPS is used optionally (if available)
- Assuming constant offsets between galleries, a matching pair contributes a constraint  $\delta_p - \delta_q = \tau_{ij}$

- Written as equation system:

- Iteratively solve using Jacobi method, and discard up to 10% largest outliers

### Cluster sub-events

- Initialize from subsequent images with high similarity
- Merge clusters based on visual similarity, weighted by time distance

## Experiments

### Four runs

- One with VLAD for both steps, others with SIFT only for offsets and VLAD for clustering
- Otherwise mainly similarity scores varied
- Some parameter adjustments to take different size of data sets into account

run	set	vis.sim.	$\theta_S$	$\theta_V$	$\theta_G$	$\alpha_t$
1	1,2	VLAD	n/a	1.70	2.5	1.0
2	1	SIFT+VLAD	0.07	1.82	2.5	0.0
2	2	SIFT+VLAD	0.08	1.80	2.5	1.0
3	1	SIFT+VLAD	0.07	1.82	2.5	0.0
3	2	SIFT+VLAD	0.08	1.85	2.5	0.0
4	1	SIFT+VLAD	0.06	1.85	2.5	0.0
4	2	SIFT+VLAD	0.08	1.80	2.5	0.0

Table 1: Submitted runs and their parameters ( $t_{min} = 120s$  and  $p = 10$  for all runs).

### Results

- Winter Olympics is more challenging
- VLAD useful for event clustering, but not discriminative enough for determining offsets
- If galleries are aligned, accuracy is quite high
- Clustering often oversegments with our methods – not all measures seem to handle this equally well
- Dependency of correct segmentation on correct offsets not well reflected in results



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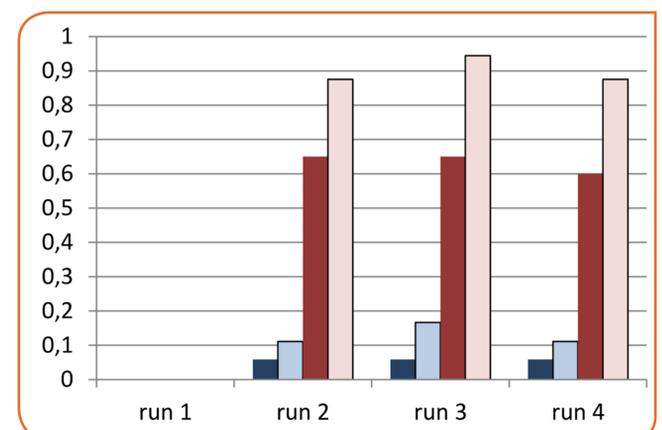


Fig. 1: Results for time offsets.

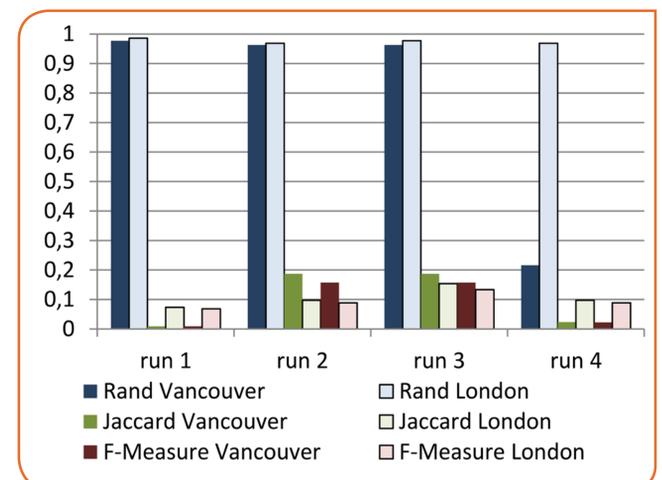


Fig. 2: Results for event clustering.