Object Trajectory Proposal (OTP): identify an object trajectory, even its appearance varies from time to time.
Object Detection in Videos

Motion seed extraction

- Optical flow estimation
- Video frames
- Optical flow
- Global motion estimation
- Motion seeds

Moving object trajectory proposal

- Segmentation initialization
- Tracking with one-iteration segmentation
- Trajectory proposal of moving objects

Static object trajectory proposal

- Sampling initialization
- Consistent sampling with pruning
- Trajectory proposal of static objects

Unified scoring

Our result
From object entities towards relations: to detect instances of relations, which is represented by a triplet `<subject-predicate-object>` with the trajectories of the subject and object.
- Constructed the 1st video relation dataset, containing 1000 annotated videos (35 obj. cat. & 132 predicates)
- Outperformed baselines adapted from image relation based methods
- Examples:

<table>
<thead>
<tr>
<th>Method</th>
<th>R@50</th>
<th>R@100</th>
<th>mAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP [30]</td>
<td>3.16</td>
<td>4.53</td>
<td>2.97</td>
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<tr>
<td>Lu’s-V [21]</td>
<td>2.52</td>
<td>4.03</td>
<td>3.45</td>
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<tr>
<td>Lu’s [21]</td>
<td>2.79</td>
<td>4.92</td>
<td>3.78</td>
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<td>VTransE [39]</td>
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<td>2.23</td>
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<td>VidVRD</td>
<td>8.75</td>
<td>10.84</td>
<td>11.47</td>
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