Motivation

v  Explore what kind of context information from videos can be used for inter-camera tracking.

❖ Spatio-temporal Context:
• One person can not appear at different locations at one time.
• A natural way of collecting positive/negative samples for discriminative appearance learning.

Examples of online sample collection

Positive samples

Negative samples

❖ Relative Appearance Context:
• People often walk in groups. The group information provides important visual context for individual appearance matching.
• Relative appearance context models the inter-object appearance similarities for people walking in proximity.

Incorporate all situations that could happen between tracks in two views, e.g. crossing transitions, returning transitions, etc., in a unified framework.

Introduction

• The field of view of a single camera is limited.
• Wide availability of cameras makes wide area surveillance possible.

❖ Objective:
Assign unique IDs when people move between cameras

❖ Challenges:
• Appearance changes due to illumination variations and pose changes
• Different targets have similar appearances.
• The prediction of the motion is much more reliable due to blind areas, e.g. people may either go to the exit in the blind area or return.
• Crowded scenarios

Approach

Introduction

• The field of view of a single camera is limited.
• Wide availability of cameras makes wide area surveillance possible.

❖ Objective:
Assign unique IDs when people move between cameras

❖ Challenges:
• Appearance changes due to illumination variations and pose changes
• Different targets have similar appearances.
• The prediction of the motion is much more reliable due to blind areas, e.g. people may either go to the exit in the blind area or return.
• Crowded scenarios

Experimental Results and Analysis

Three cameras, 25-min videos, 206 crossing transitions and 15 returning transitions.

X: crossing, R: returning, Frag: track fragment, IDS: ID switch

The lower the numbers, the better performance.

<table>
<thead>
<tr>
<th>X-Frag</th>
<th>X-IDS</th>
<th>R-Frag</th>
<th>R-IDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Kuo et al. [ECCV2010]</td>
<td>4</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>(b) Our method w/o relative app context</td>
<td>8</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>(c) Our method</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Applications of Inter-camera Multiple Target Tracking

❖ Long-term wide area event detection, “people following”.

Conclusion and Future Work

❖ Inter-camera multiple target tracking using context information from videos.
• Wide area persistent people tracking with a face ID.