**Introduction**

- In quasi-dense matching the goal is to match most of the pixels between two views of a scene.
- The match propagation algorithm was proposed by Lhuillier and Quan (TPAMI 2002).
- In this work the match propagation technique is extended to the wide baseline case.

**Background: match propagation**

Given a set of seed matches \( \{ (x_i, x'_0) \} \), the propagation proceeds by iterating the following three steps:

(i) the seed point \((x_i, x'_0)\) with the best ZNCC score is removed from the list of seed points

(ii) new candidate matches are searched from the spatial neighborhood of the current seed \((x_i, x'_0)\)

(iii) the candidate matches exceeding a ZNCC threshold are stored and added to the list of seed points

**First extension: affine normalization**

An affine transformation model is assumed for the local image patches:

**Second extension: adaptivity**

The local transformation estimate may not be accurate outside the immediate neighborhood of the seed match. Hence, we propose an adaptive propagation algorithm where the affine transformation estimate is updated during the propagation:

- the local transformation is estimated up to rotation using the second moments of windowed intensity functions
- the remaining rotational degree of freedom is determined using the epipolar geometry

**Problems**

The direct use of cross-correlation as a similarity measure implies some problems when

- the transformation is not pure translation even locally
- the transformation is not the same for all surfaces in the scene

**Outline of the quasi-dense approach**

The quasi-dense approach by Lhuillier and Quan:

- sparse matching of seed points
- unconstrained propagation
- subpixel refinement by fitting local homographies
- epipolar geometry estimation
- constrained propagation with the epipolar constraint
- subpixel refinement by fitting local homographies

**Matching three views of a 3D scene. Left: Original, Middle: Affine+Adaptive, Right: Top view in 3D.**