PR01 GOOD FEATURES

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Summary

Shi and Tomasi have made bellow three contributions in the paper [1].

1. **Feature Selection Criterion**: Authors have suggested that a good feature is the one that can tracked well. If two large eigenvalues are associated with a point, where difference between the magnitudes of both eigenvalues is less and smaller eigenvalue also offset the noise then such point represent a corner in an image it can be reliably tracked.

2. Two **Tracking models** has been discussed for defining displacement of a feature point in consecutive frames.

   a. In oder to measure displacement of the feature window (a spatial window containing feature point/s) in consecutive frames, **Affine motion model** considers translation and affine transformation of the feature window . Here deformation matrix is responsible for performing the affine transformation. Parameters associated with deformation matrix and displacement value have been calculated by minimizing the dissimilarity.

   b. It is good idea to have small window size while performing tracking, but it is difficult to estimate correct distortion parameters for a small window. Any error associated with the parameters of deformation matrix will also introduce error in the displacement measurements hence a **pure translation model** can be used where deformation matrix will be set to 0.

   Finally a combined model based on above two approaches can be constructed where Pure Translation Model will be used for tracking the feature points and Affine model will be used for feature monitoring.

3. Authors have stated that for performing efficient tracking, there should be a mechanism for asserting the quality of feature points. They suggested **feature monitoring method** which uses Affine Motion Model for quantifying dissimilarity of feature point in the current frame from it's version present in first frame. With experiment authors have found that feature points get distorted due to occlusions and dis-occlusions.

References

[1] Jianbo Shi and Carlo Tomasi. Good features to track. Technical report, Ithaca, NY, USA, 1993.