1. INTRODUCTION

Stereo Matching
- Objective:
  - Find the correspondence points between stereo images
- Challenge:
  - Matching ambiguities at homogeneous and occlusion regions

2. DESIGN OF CORRESPONDENCE MATCHING

Computational Stereo
- Modeling: Monocular and binocular cues
- Impossible to perfectly model several depth cues!

3. FEATURE SPACE

Feature Space
- Feature space: Connected clusters formed by neighboring points with similar brightness
- Two feature spaces are similar if they are similar.

Feature Space Similarity (Coherence)
- Two feature spaces are coherence if they are similar.
- Finding local mode; mean shift
  - Iteratively computes mean vector, followed by the translation of the kernel by using the mean shift vector:
    \[ t_r = \frac{1}{N} \sum_{i=1}^{N} (x_i - t) \]
    \[ t = t_r + \frac{1}{N} \sum_{i=1}^{N} (x_i - t) - (x_i - t) \]

Feature space: \( F = \{ p, c \} \)

4. COST AGGREGATION VIA ANISOTROPIC DIFFUSION

Motivation: Anisotropic Diffusion
- Disparity gradient is a function of feature similarity, i.e., more dissimilar features allows larger disparity gradients.
- Two points are more likely to have similar depth if two feature spaces are similar.

Observation:
- Observation: Two points are more likely to have similar depth if two feature spaces are similar.
- The role of the function \( f(\cdot)\) is the same as the “edge-stopping” function (monotonically decreasing function) in anisotropic diffusion.

5. EXPERIMENTAL RESULTS

Results for (from top to bottom) “Tsukuba”, “Venus”, “Teddy” and “Cone”. (from left to right) reference images, adaptive weight [3], proposed method when disparity is 0.

- It diffuses pixels inside same depth levels while preventing pixels from being diffused across different depth levels.
- Distinct discrimination is observed across the different depth levels.

OBJECTIVE EVALUATION [3]

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Tikalaka</th>
<th>Venus</th>
<th>Teddy</th>
<th>Cone</th>
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<tr>
<td>NonOcc</td>
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<td>NonOcc</td>
<td>Disc</td>
<td>NonOcc</td>
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