Inertial Projection Neural Network for Nonconvex Sparse Signal Recovery with Prior Information

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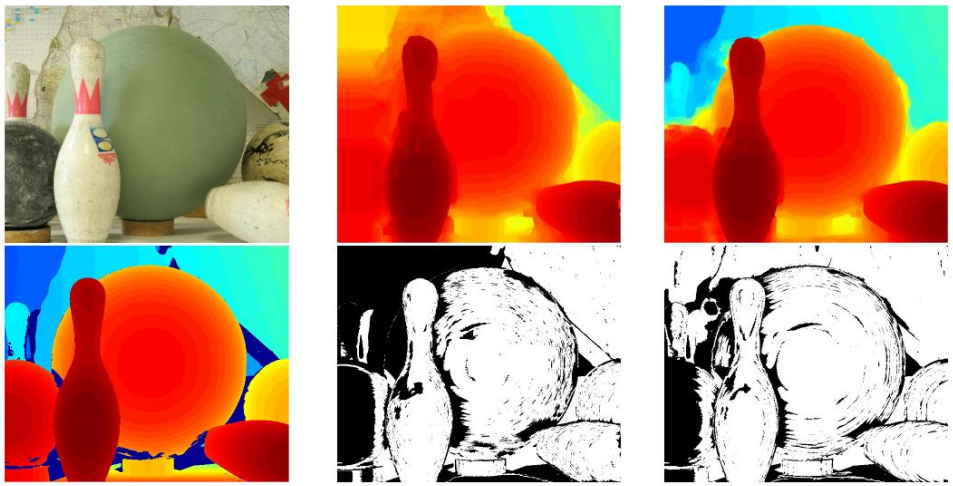
Problems & Ideas

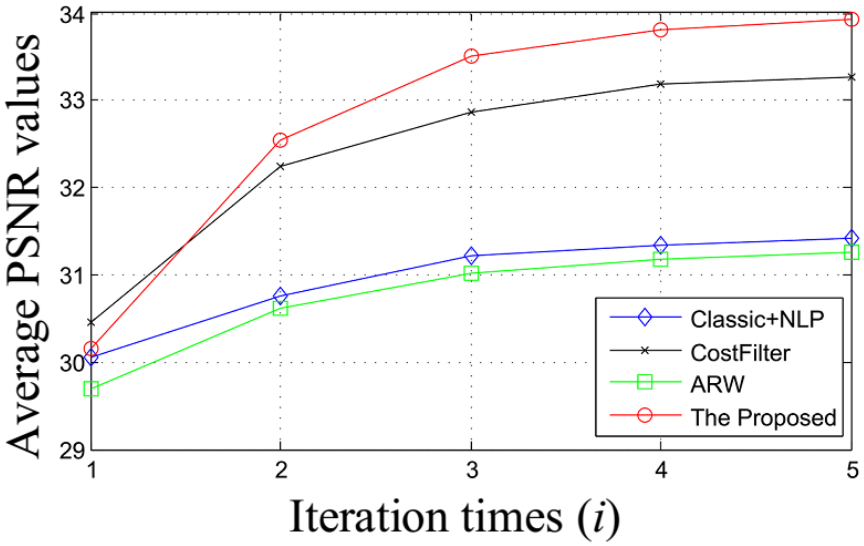
- Problems of conventional stereo matching approaches:
  - Stereo matching and view synthesis are considered as two sequential procedures.
  - Existing binocular stereo matching approaches tend to fail in occluded and disparity discontinuous region.
- Ideas: A joint view synthesis and disparity refinement model that takes both view synthesis quality and disparity accuracy into account.

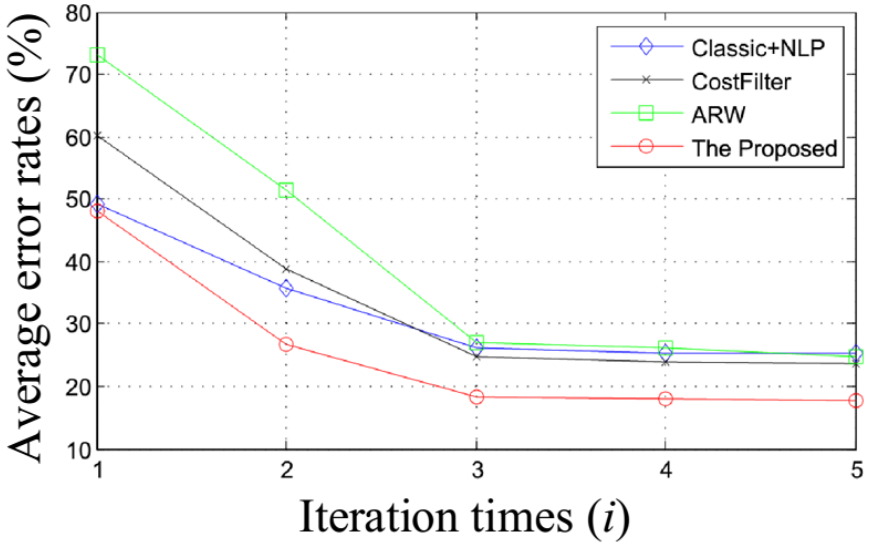


Disparity maps using different views. Left: Left view and its ground truth disparity map; Middle: Disparity map produced by the original input image pair and its error map at 0.5-pixel threshold (31.83\%); Right: Disparity map produced by the proposed joint view synthesis and disparity refinement model and its error map (25.80\%).

Main Contributions

- Contributions:
  - A novel joint virtual view synthesis and disparity refinement model that outputs not only refined disparity maps but also a synthesized middle view with high visual coherency;
  - A disparity maps fusion scheme to eliminate the error caused by potential interpolation artifacts, providing new disparity maps for the synthesized view updating;
  - A disparity-assisted plane sweep-based rendering method to weaken interpolation errors caused by bad pixels in the disparity maps.





Interpolation and stereo results yielded by each method versus the iteration time. Left: the average PSNR values of interpolation; Right: the average error rates at 0.5-pixel threshold of stereo.