Multi-Setup Depth Perception through Virtual Image Hallucination

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Introduction

RGB/Event Stereo Matching

Problems
- Stereo networks suffer in the presence of large untextured regions and facing domain shifts
- Active stereo uses pattern projection, which is not always feasible (e.g., outdoor, long-range)

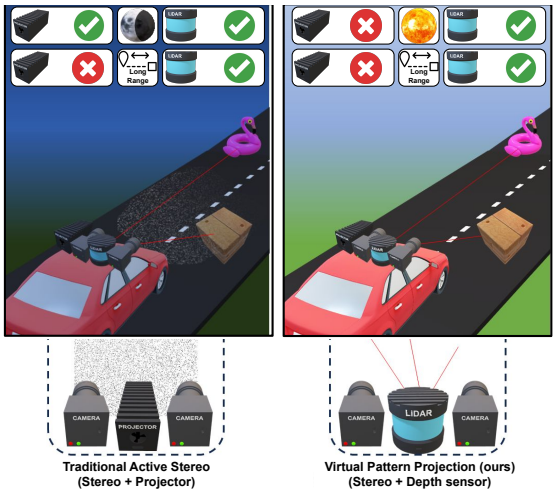
Proposal
- We **hallucinate** images according to the sparse measurements from a depth sensor
- This setup works in any environment if coupled with an appropriate depth sensor

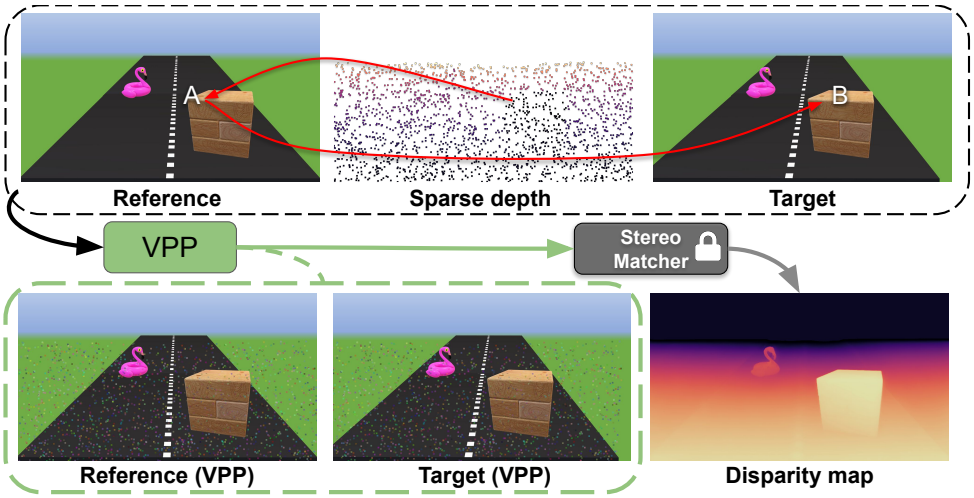
Depth Completion

Problems
- Depth completion methods lack **generalization** across different domains
- Varying the **density of the depth points** yields large drops in accuracy

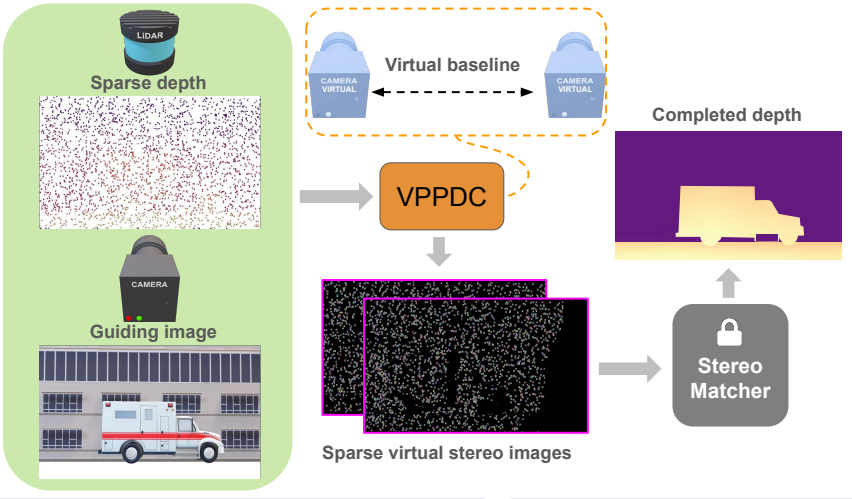
Proposal
- We leverage the strong generalization capabilities of **deep stereo networks**
- Purposely, we generate **virtual stereo pairs** out of sparse depth points

Virtual Pattern Projection (VPP) principle for Stereo Matching

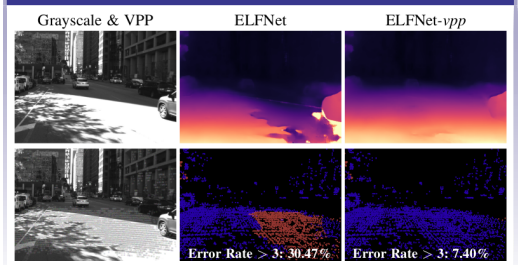




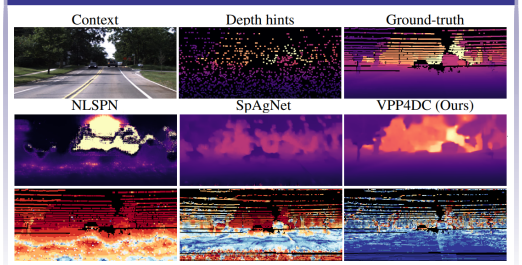
VPP extended to Depth Completion and Event Stereo Matching



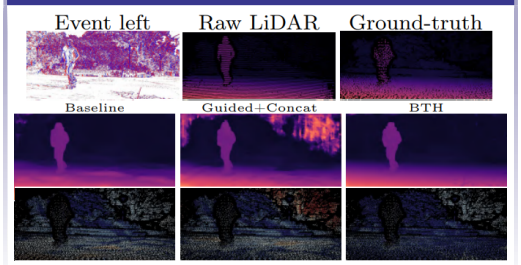
VPP in action



VPPDC in action



BTH in action



References

Project Page

Papers

Code