Controlling Camera and Lights for Intelligent Image Acquisition and Merging

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Controlable Lights for Vision
- Controlable lights accompany video cameras in space, mining, and endoscopic medicine to help overcome poor lighting and varying environmental conditions.

Problems: Parameter Control and Image Merging
- How to choose the best parameters for camera and lights given the current state?
- How to combine information about a static target from images taken under several light and camera conditions?

Our testbed: 8x8x8x15 parameter combinations per image.

Approach: Knowledge-Based Control and Entropy-Based Rendering
- Use IndiGolog (IG) agent programming language to create an intelligent controller.
- Combine images to maximize the entropy of their composite.

Experimental Results

Conclusion
- Prototype controller for image acquisition and merging
  - reasons about image similarity in terms of mutual information, maximizing the entropy of the final composite,
  - facilitates further image processing, such as for pose estimation or tracking,
  - contributes to the development of tools for intelligent controller design, which include a library of control components.

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