Wide Area Camera Calibration Using Virtual Calibration Objects

Xing Chen, James Davis, Philipp Slusallek

Goal
Calibrate many cameras arranged to cover a wide area working volume. Building a large physical calibration object is impractical.

Solution
Build a large virtual calibration object, that covers the entire working volume.

Method
Use all cameras to observe a moving object. Iterate between solving for the object path, and using this path as a virtual calibration object to solve for camera position.

Results
Camera arrangement to be calibrated: Note that since the cameras cover a wide area, traditional calibration is not possible.

Comparison with traditional calibration
A space in which a comparison with traditional calibration is possible.

Projection error as a function of iterations using a virtual calibration object: Note that very stable convergence to the correct camera calibration is obtained.

Projection error of a moving object: Note that the quality of the calibration obtained using our method compares favorably with traditional calibration methods.