Multi-projector calibration application – manual

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An application for geometric and intensity calibration of a projector array. The projectors utilize an attached camera to automatically compute the relative pose among them. The application includes projector gamma curve measurement, which is used for intensity blending for seamless overlapping of projector images. The calibration runs fully automatic.

Requirements

- 4 or 2 projectors
- Camera canon 50D
- Planar projection surface

Default display layout

Display layout is defined in file config.txt.

Calibration process

1. Connect camera and projectors
2. Setup default projector layout.
3. Run calibration application.
4. Press key "f" to fullscreen the projector window.
5. Press key "r" to start calibration process.
6. Calibration result is shown at the end of calibration. By default, the image from primary display is rendered into the multi-projector display.

The application creates projective transformation matrix and intensity attenuation map for each projector. The matrix represents transformation between a projector image coordinate system and result seamless image. The matrix is stored as OpenCV matrix in file "var/Projector_hom_X_1.txt", where X is projector index. The attenuation map is stored in "var/lightMap_X.jpg", where X is projector index.

Application control keys

- n – Switch between projectors while rendering checkerboard.
- t – Take a picture while rendering checkerboard.
- +/- - Increase/decrease number of columns and rows in checkerboard.
- Esc – Quit application.
- a – Test result, render seamless rectangular image.
- w – Show grid while testing result.
- p – Show intensity attenuation maps, after calibration.
- r – Run automatic calibration process .
- i - Gamma measurement mode.