Background

**Pre-Visualization (PreViz):** A CG-animated storyboard created in the early stage of film production (pre-production; pre-pro)

**Mixed Reality (MR):** Seamless merging technology of real and virtual world in realtime

**MR-PreViz**

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MR + PreViz = MR-PreViz
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(“MR + PreViz” to improve the performance (looks, interactivity, saving cost in pos-pro, etc.)

Stereoscopic 3D (S3D) MR-PreViz System

**Stereoscopic Cinematography in MR-PreViz**

- **S3D MR-PreViz is S3D extension of MR-PreViz**
  - On-site camerawork and S3D examination in pre-pro

Camera registration on the Previous System

- “Monocular” camera registration consists of off/online processes
  1. Scene capture on the rehearsal path
  2. 3D reconstruction and store the data in landmark DB (LMDB)
  3. MR-Composition in S3D
  4. Stereo camera calibration → Repeat 3 and 4

**Proposed Method**

- **Goal:** Realtime stereo camera registration based on ICP algorithm
- **Method:**
  1. Stereo frames and its calibration result
  2. Fast stereo matching based on constraints of stereoscopic cinematography
  3. Map refinement on the rehearsal path during MR-PreViz

Data Flow

- Given 3D points from a stereo frame, a map is build, extended, and refined at every frame
- The map consists of multiple sub-maps
  - Multi-core CPU for frame-model matching and the refinement
- Camera pose is calculated using the 3D point sets

Stereo matching

- Limit stereo search range using stereo uncertainty and NPP
  - NPP (Native Pixel Parallax): Max. disparity when shooting S3D
  - \[ \sqrt{\frac{dfB}{2cZ}} \] < search range
  - \[ < \frac{W_{interocular}}{W_{screen}} \frac{W_{pt}}{NPP} \]
- L to R and R to L search

Results

- S3D MR-PreViz without LMDB construction ran in app. 15 [FPS]

**In-House Technical Tour is NOW being held!!**

- **Theme:** Mixed Reality Based Pre-Visualization for Filmmaking and Its Vision Related Technology
- **Key Technology:**
  - Real-time marker-less camera tracking for onsite 3D matchmove
  - Virtual lighting/relighting effect for both virtual and real objects
  - Interactive mixture of mocap and 3D video data of stunt actions
  - Onsite stereoscopic 3D-PreViz that uses professional stereo rigs
- **Date & Time:**
  - Taking app. 30 min. (incl. moving time), 10 persons/group
- **Sign up on 5th floor!!**