

Performance-driven Facial Animation

Garoe Dorta Perez, Ieva Kazlauskaitė, Richard Shaw

University of Bath
Centre For Digital Entertainment

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Richard's Part

Ieva's Part

Garoe's Part

Results

- Performance capture using two DSLR cameras in stereo.
- Video recorded at 60fps with resolution 640×480 pixels.
- Video streams synchronised using audio signals.



Figure: The data capture session using two DSLR cameras in stereo.

- Markers are drawn onto the actor's face to track the facial performance.

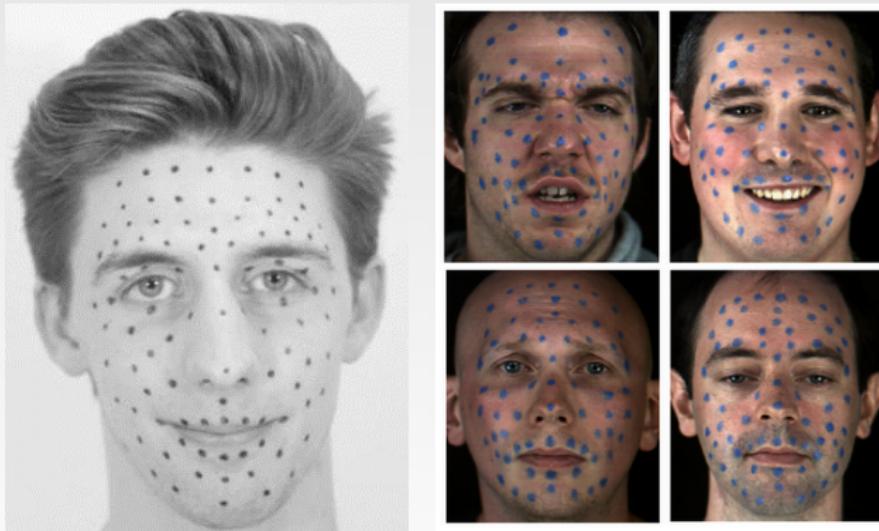


Figure: Marker positions were roughly based on the Surrey Audio-Visual Expressed Emotion (SAVEE) Database.

- A checkerboard pattern used to calibrate stereo camera setup.
- Obtain the cameras' intrinsic and external parameters.
- Compute the projection matrices and fundamental matrix.

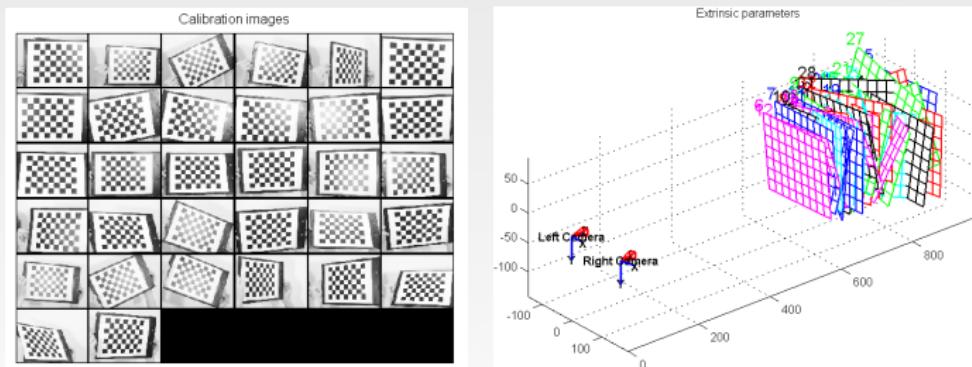


Figure: The stereo cameras were calibrated using a checkerboard pattern.

- Using the camera parameters we rectify each stereo pair for a captured image sequence.
- Corresponding epipolar lines lie on the same pixel rows.
- Reduces correspondence problem to a 1D search.



Figure: Each frame of an image sequence is stereo rectified.

- Face markers are detected by computing SIFT features in the left image of the first frame.
- Wrongly detected pixels can be removed and additional points included interactively.

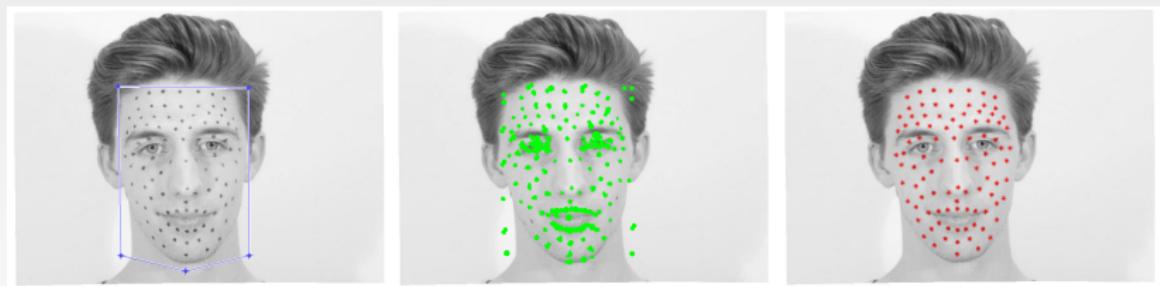


Figure: Markers on the face are detected using SIFT features.

- Corresponding markers in the right image are found by searching along the corresponding epipolar lines.
- Matching features are found by computing the normalised cross-correlation for image patches around each feature point.

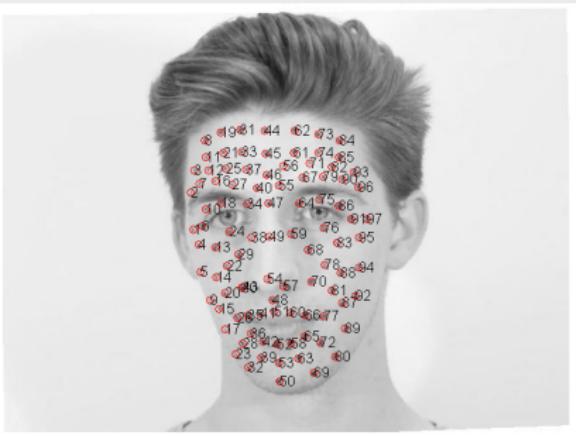


Figure: Corresponding markers are found in the right image.

- We track the face markers throughout the entire image sequence using the KLT tracking algorithm.

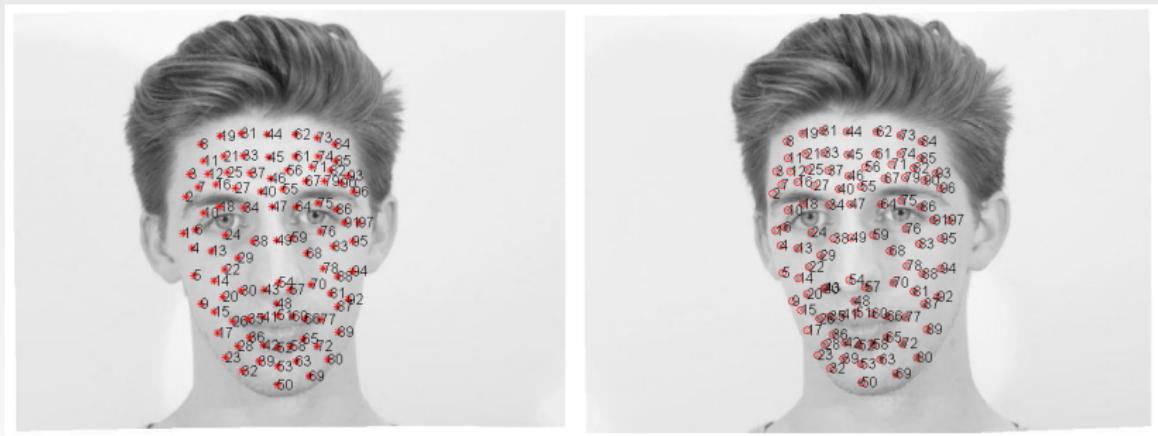
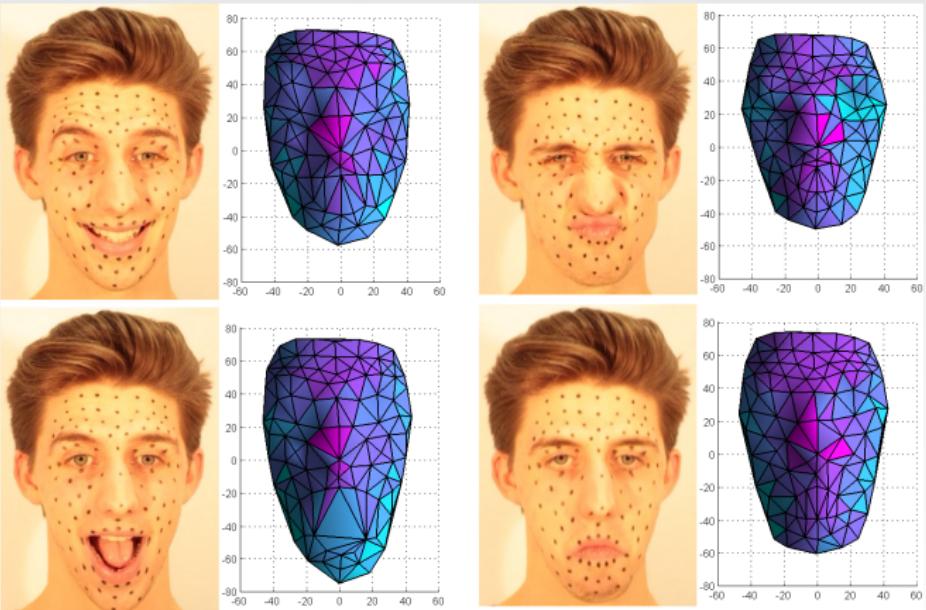


Figure: Corresponding markers are found in the right image.

- Using the known camera projection matrices, we compute a sparse 3D reconstruction for every frame.



- We attempt to remove the rigid head motion by performing Procrustes alignment.
- The head pose in each frame of an image sequence is aligned to the neutral pose.
- The 3D point trajectories are also smoothed to remove jittery head motion.

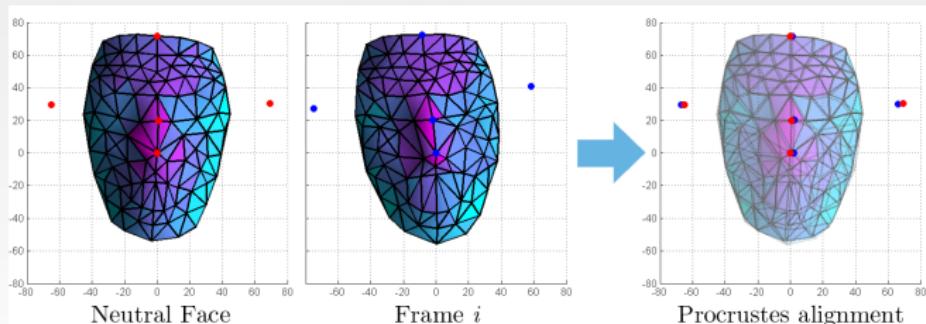


Figure: Rigid head motion is removed using Procrustes analysis.

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