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Monocular 3D facial shape reconstruction from a single 2D image with coupled-dictionary learning and sparse coding

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Highlights

- Proposing a dictionary-based parametric model of 3D facial shape that achieves more than 50% and 20% improvement in reconstruction accuracy for seen and unseen data, respectively, over the widely applied PCA-based subspace model.
- Developing an efficient algorithm for estimating the sparse 3D facial shape from 2D facial landmarks that is generalizable to different types of data, including facial images, portraits, and facial sketches.
- Developing an algorithm for 3D super-resolution that reconstructs the dense 3D face based on the estimated sparse 3D facial shape and achieves an average of 10% reduction in reconstruction error over four state-of-the-art algorithms.

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