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**Research Article** 

## A Dense Point-to-Point Alignment Method for Realistic 3D Face Morphing and Animation

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## Abstract

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We present a new point matching method to overcome the dense point-to-point alignment of scanned 3D faces. Instead of using the rigid spatial transformation in the traditional iterative closest point (ICP) algorithm, we adopt the thin plate spline (TPS) transformation to model the deformation of different 3D faces. Because TPS is a non-rigid transformation with good smooth property, it is suitable for formulating the complex variety of human facial morphology. A closest point searching algorithm is proposed to keep one-to-one mapping, and to get good efficiency the point matching method is accelerated by a KD-tree method. Having constructed the dense point-to-point correspondence of 3D faces, we create 3D face morphing and animation by key-frames interpolation and obtain realistic results. Comparing with ICP algorithm and the optical flow method, the presented point matching method is efficient for dense point objects registration.

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