Aided 3D Facial Restoration for Plastic Surgery Planning using Elastic Radial Curves

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Abstract

Improving appearance and guarantying healthcare are the important objectives of facial plastic surgery. Face can be the seat of tumors that can be restored using 3D images in a way to surpass 2D limits such as change in illumination conditions and pose variation. This work proposes a Riemannian geometry approach to illustrate the degradation of facial tumefaction which is based on geodesic paths between healthy and swollen half of the face. The progressivity of tumor volume assists plastic surgeons in approaching the harmonious shapes for facial restoration. We introduce a preprocessing step to prepare 3D scans chosen from FRAV 3D database then sculpted to simulate unilateral tumors. We present facial surfaces by indexed collections of radial curves emanating from the nose tips. Symmetric indexed radial curves are compared using elastic shape analysis.

References

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Index Terms

Computer Science

Image Processing

Keywords
Riemannian geometry, symmetric radial curves, geodesic path, 3D facial restoration, plastic surgery planning.