

# 안면 측정 기준점 자동 탐색 기술의 문헌 조사

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## A Literature Review of Automatic Facial Landmark Detection Techniques

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### ABSTRACT

**Objective:** The present study aimed to organize automatic 3D facial landmark detection issues to use as a reference to develop automatic 3D landmarking algorithms for ergonomic applications. **Background:** Facial landmarks of the 3D digital human model (DHM) can be used to measure facial dimensions and extract features, which are essential for ergonomic product development and ergonomic applications. Facial landmarks are located manually through commercial or self-developed software, which takes huge human effort and time. **Method:** Thirty papers were screened in a systematic manner for an in-depth analysis of 3D landmark detection. **Results:** 3D facial localization methods were organized into three categories: (1) AI-technique-based method, (2) Template-fitting-based method, and (3) Geometrical shape-based method. Eleven landmarks that critical to facial anthropometry were excluded in the existing studies. The public 3D face scan database shows insufficient for machine learning-based methods that require a large number of samples. Mean error of 3D Euclidian distance between identified landmarks and baselines was the most popular measure to evaluate landmark detection performance. **Conclusion:** A 3D facial landmark detection for ergonomic applications such as anthropometric measurement needs to be developed. The performance of landmark detection techniques need improvement in conditions of large-scale pose, different expressions, various illuminations, and partial occlusions. **Application:** The present study can contribute to development of an automatic detection technique of facial landmarks for ergonomic applications.

**Keywords:** Automatic Landmark Detection, Facial Landmarks, Facial Dimension Measurement

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