Real Time 3D Palmprint Pose Estimation and Feature Extraction Using Multiple View Geometry Techniques

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Abstract

In this paper, it was aimed to develop a system that works in real time for to obtain palmprint pose (point of view) of a fully opened hand towards the camera. This system will be both a platform independent model (non-touchable) and arising from the hand movement rotations, translations and scaling independet model. For this purpose, pointed at the same direction two cameras (stereo) is used instead of single-camera vision systems system. Palmprint informations carried to 3D space using Mutliple View Geometry techniques from the obtained images. Thus, the problems are eliminated in previous studies as rotation, translation, scaling and platform dependecy.

Common points must be identified and mapped for capture of 3D palmprint on obtained images from two cameras. SURF algorithm based on Hessian matrix is determined common interest points on real-time snapshots of each cameras. The Levenberg-Marquardt optimization algorithm is used to minimize deviations from the characteristics of the cameras. Paired interest points of palmprint was considered to be approximately on a plane. Normal of 3D plane will give palmprint pose (point of view) according to the cameras. Finally, the palmrint image were transferred to the 2D surface with affine transformation. As a result, palmprint patterns have been obtained for strong 2D recognition palmprint systems.

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