Real Time 3D-Handwritten Character and Gesture Recognition for Smartphone

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Abstract

This Paper presents two different models for smartphone based 3D-handwritten character and gesture recognition. Smartphones available today are equipped with inbuilt sensors like accelerometer, gyroscope, and gravity sensor, which are able to provide data on motion of the device in 3D space. The sensor readings are easily accessible through native operating system provided by the smartphone. The accelerometer and gyroscope sensors data have been used in the models to make the systems more expressive and to disambiguate recognition. The acceleration generated by the hand motions are generated by the 3-axes accelerometer present in smartphone. Data from gyroscope is used to obtain the quaternion rotation matrix, which is used to remove the tilting and inclination offset. An automatic segmentation algorithm is implemented to identify individual gesture or character in a sequence. First model is based on training and evaluation mode, while second one is based on training-less algorithm. The recognition models as presented in this paper can be used for both user dependent and user independent 3d-character and gesture recognition. Results shows that, Model I gives an efficient recognition rate ranging from 90% to 94% obtained with minimal training sequence,
while the Model II gives a recognition rate of 88%.

References


Index Terms

Computer Science

Pattern Recognition

Keywords

Accelerometer, Dynamic time warping, Gyroscope, Mahalanobis distance, Quaternion Rotation