Applying Deep-Learning to Reconstruct
Accurate 3D BodyMaps Using Mobile Phones

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Abstract

In this paper, we present the application of Generative Adversarial Network (GAN) deeplearning neural networks to build a 3D body-model using a very large – 100,000 body-scan – proprietary database. We learn the relationships between multi-viewpoints and the corresponding body-measurements and also use a hierarchical PCA in the semantic segmentation of body-information. We then use recent Augmented Reality functionality of mobile phones (ARkit on ios) to determine a Height reference for a person and then ask the person to rotate with their arms slightly apart. The video of this action, sampled at 25 framesper-second, provides a very large data set to fit our learnt body-models and derive measurements and body-shape information. The approach also takes into account differences in body-measurements due to breathing. The results of several female and male models bodyscanned using this method were compared with output from a TC2 KX16 body-scanner. The results were comparable, within 1 cm deviation on key measurements – bust/chest, waist and hips. We believe that this opens up the possibility of large scale adoption of 3D body-mapping for millions of consumers worldwide.

Keywords: 3D body-mapping, 3D body-scanning, Generative Adversarial Network, deep learning, 3D reconstruction