

Pose Normalization Network for Object Classification

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Abstract : Convolutional Neural Networks (CNN) have demonstrated their effectiveness in synthesizing 3D views of object instances at various viewpoints. Given the problem where one have limited viewpoints of a particular object for classification, we present a pose normalization architecture to transform the object to existing viewpoints in the training dataset before classification to yield better classification performance. We have demonstrated that this Pose Normalization Network (PNN) can capture the style of the target object and is able to re-render it to a desired viewpoint. Moreover, we have shown that the PNN improves the classification result for the 3D chairs dataset and ShapeNet airplanes dataset when given only images at limited viewpoint, as compared to a CNN baseline.

Keywords : convolutional neural networks, object classification, pose normalization, viewpoint invariant

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