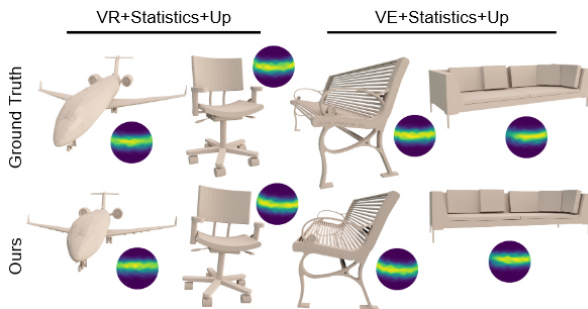


Enabling Viewpoint Learning through Dynamic Label Generation

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Optimal viewpoint prediction is an essential task in many computer graphics applications. Unfortunately, common viewpoint qualities suffer from major drawbacks: dependency on clean surface meshes, which are not always available, insensitivity to upright orientation, and the lack of closed-form expressions, which requires a costly sampling process involving rendering. We overcome these limitations through a 3D deep learning approach, which solely exploits vertex coordinate information to predict optimal viewpoints under upright orientation, while reflecting both informational content and human preference analysis. To enable

this approach we propose a dynamic label generation strategy, which resolves inherent label ambiguities during training. In contrast to previous viewpoint prediction methods, which evaluate many rendered views, we directly learn on the 3D mesh, and are thus independent from rendering. Furthermore, by exploiting unstructured learning, we are independent of mesh discretization. We show how the proposed technology enables learned prediction from model to viewpoints for different object categories and viewpoint qualities. Additionally, we show that prediction times are reduced from several minutes to a fraction of a second, as compared to viewpoint quality evaluation. We will release the code and training data, which will to our knowledge be the biggest viewpoint quality dataset available.