3D Highlighter: Localizing Regions on 3D Shapes via Text Descriptions

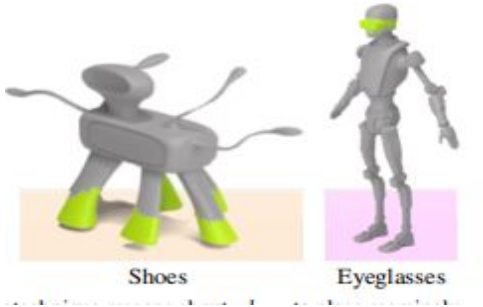
Semantic localization of regions on 3D meshes is an important problem in computer graphics and vision with broad applications.

3D Highlighter, a technique for localizing semantic regions on a mesh using text as input. system demonstrates the ability to reason about where to place non-obviously related concepts on an input 3D shape, such as adding clothing to a bare 3D animal model.

-> "Out-of-domain" localizations.

->Contextualizes the text description using a neural field and colors the corresponding region of the shape using a probability-weighted blend

-> Neural optimization is guided by a pre-trained CLIP encoder, which bypasses the need for any 3D datasets or 3D annotations.



History

Geometry-driven segmentation. Traditional works in geometry processing use low-level geometric features (such as surface area, curvature, or geodesic distance) in order to infer high-level semantic attributes for segmenting shapes.

Data-driven segmentation.In the deep learning era, the 3D part segmentation task has been widely tackled by neural network models . Training such a model is typically done in a fully-supervised manner on a large dataset of shapes annotated with a given set of part classes.

Text-guidance. Recent works have leveraged pretrained vision-language embedding spaces, such as CLIP , for analysis, synthesis, and editing.

Tannushree Rana , B421063

3D Highlighter: Localizing Regions on 3D Shapes via Text Descriptions

Remaining challenges

1. there should still be a logical connection between the 3D shape and its description

2.Semantic Ambiguity: when the input is very general ,it may find difficulity to localize the target correctly

Novel solutio

1. Color-Based-Visualization- using highlighter color to visualize the network predicted segmentations. apart from relying solely on text description ,this approach uses visuals highlighting to indicate the segmented regions.

2.Improved Text-Guided Segmentation: The method integrates text-guided segmentation with robust visual feedback. By applying a color-based highlighting technique , it enhances the ability to visualize and correct segmentation results ,even when the text -description is not perfectly accurate but resonably similar.

Tannushree Rana,B421063