

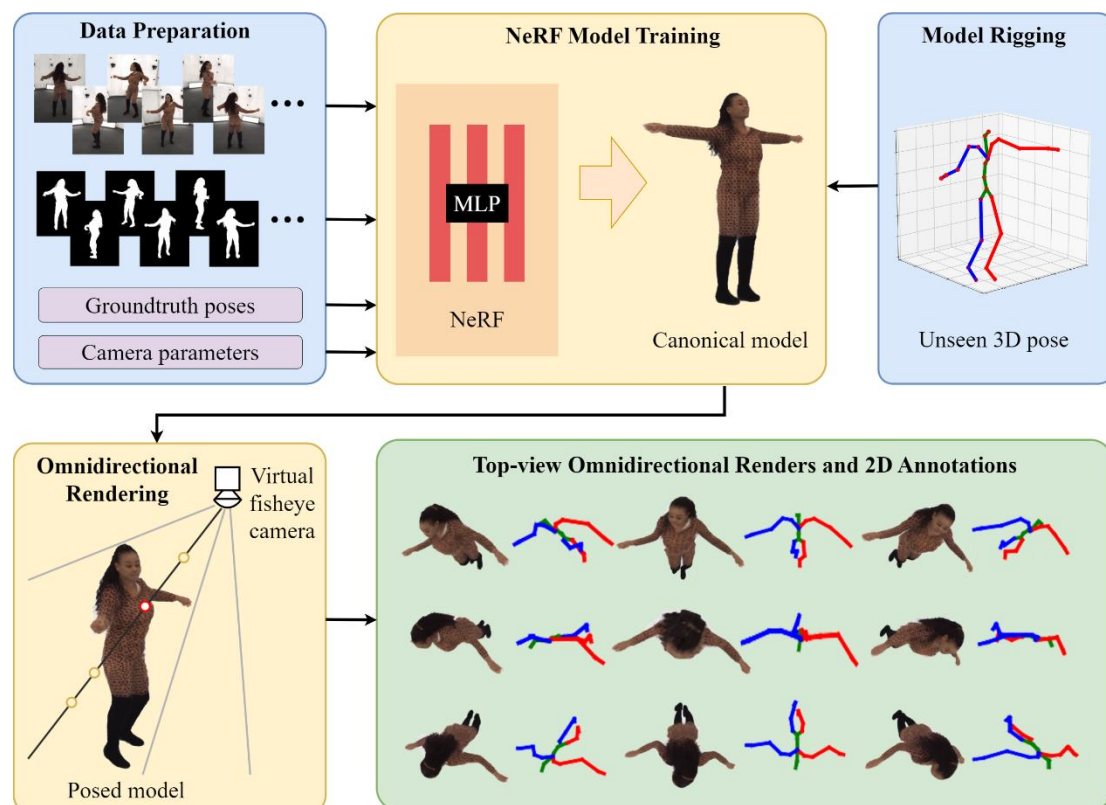
Rendering Humans in Fisheye with 3DGS and Human Pose Estimation in 3D

Research Project or Master Thesis

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Human pose estimation (HPE) is a critical application field of computer vision. Deep learning methods rely on large amounts of data for training neural networks for 2D and 3D HPE for frontal views. However, when it comes to other perspectives, for example top-view fisheye images, the available data is very scarce. Our research aims to bridge this data gap and enable HPE for any view.

Our previous work, NToP: a large-scale top-view fisheye HPE dataset (<https://github.com/yu-jingrui/NToP>), used NeRF for novel view synthesis. Any existing multi-view human pose datasets can be used to train a NeRF model, then new images in the topview with a fisheye perspective can be rendered to facilitate training DL models for 2D and 3D HPE. The workflow of NToP:



However, NeRF is computationally costly. It cannot render the person with deformable clothes or background. Therefore, we want to make use of 3DGS for new data generation. Then train state-of-the-art models for 3D human pose estimation from monocular images.

The student's work should contain the following steps:

- Literature research on available methods for human novel view synthesis with 3DGS and 3D HPE
- Implement one of the methods (for example D3GA and HUGS) to render persons in the top-view with deformable clothes and background
- Generate a large dataset with annotations
- Train a sota 3D HPE model and evaluate its performance

Requirements:

- Basic understanding of computer vision
- Preferably good results in Computer Vision 1 and Computer Vision 2
- Good programming skills in Python

Contact information:

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