NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

MMLab @NTU

ICCV OCT 19-23, 2025 HONOLULU HAWAII

Textured 3D Regenerative Morphing with 3D Diffusion Prior

Songlin Yang, Yushi Lan, Honghua Chen, Xingang Pan

MMLab@NTU, Nanyang Technological University

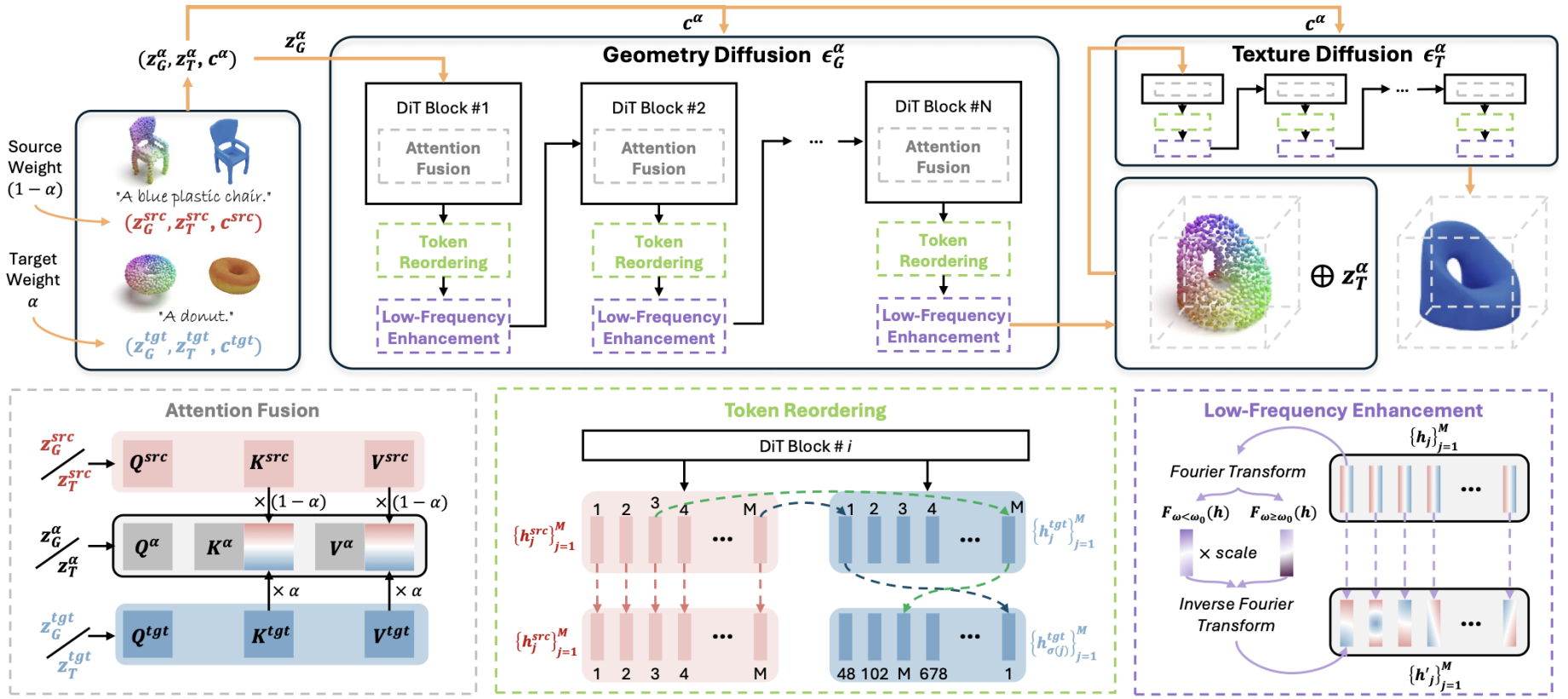
Introduction

- Textured 3D morphing creates **smooth** and **plausible** interpolation sequences between two 3D objects, focusing on transitions in both **shape** and **texture**.

Motivation

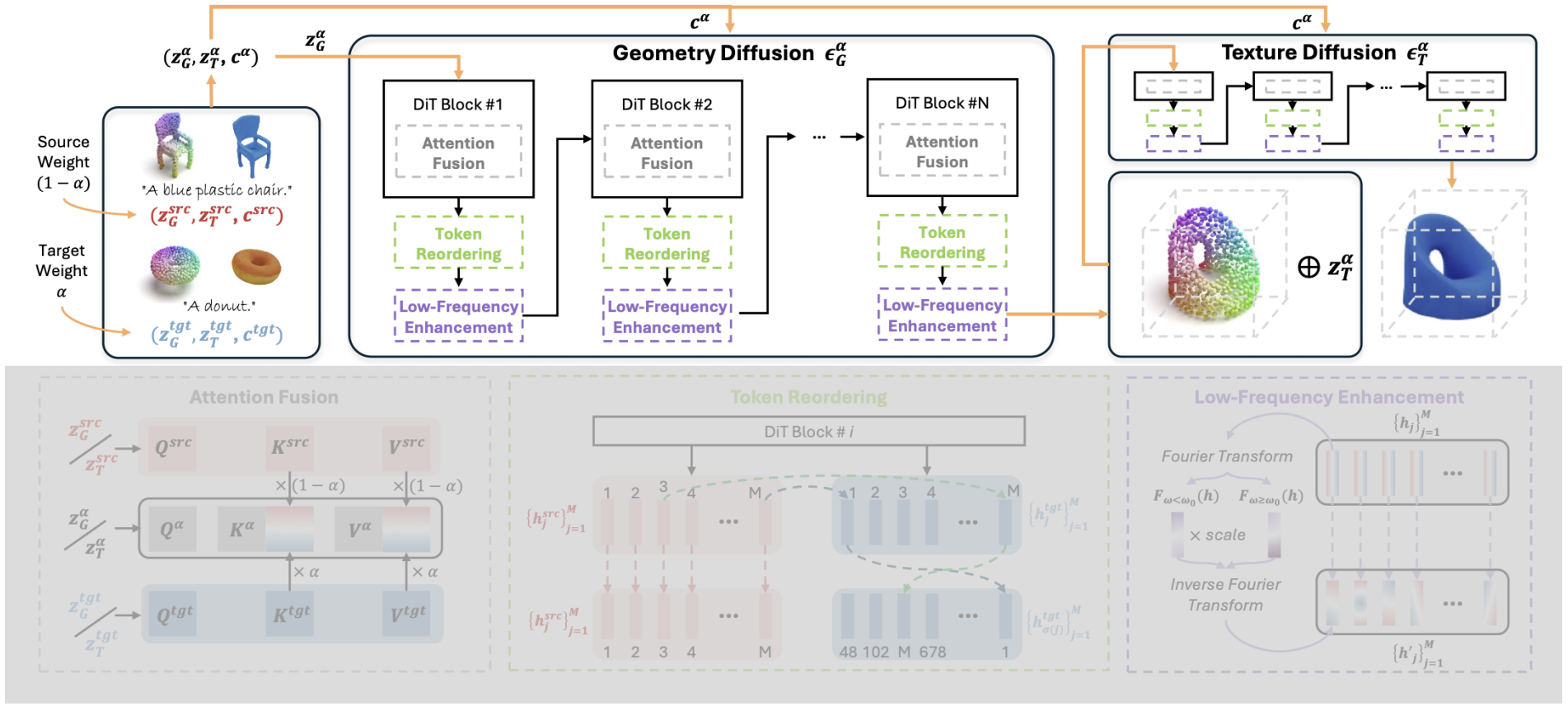
- Previous methods rely on establishing point-to-point correspondences and determining smooth deformation trajectories, which inherently restrict them to shape-only morphing on untextured, topologically aligned datasets. This restriction leads to labor-intensive preprocessing and poor generalization.

Method



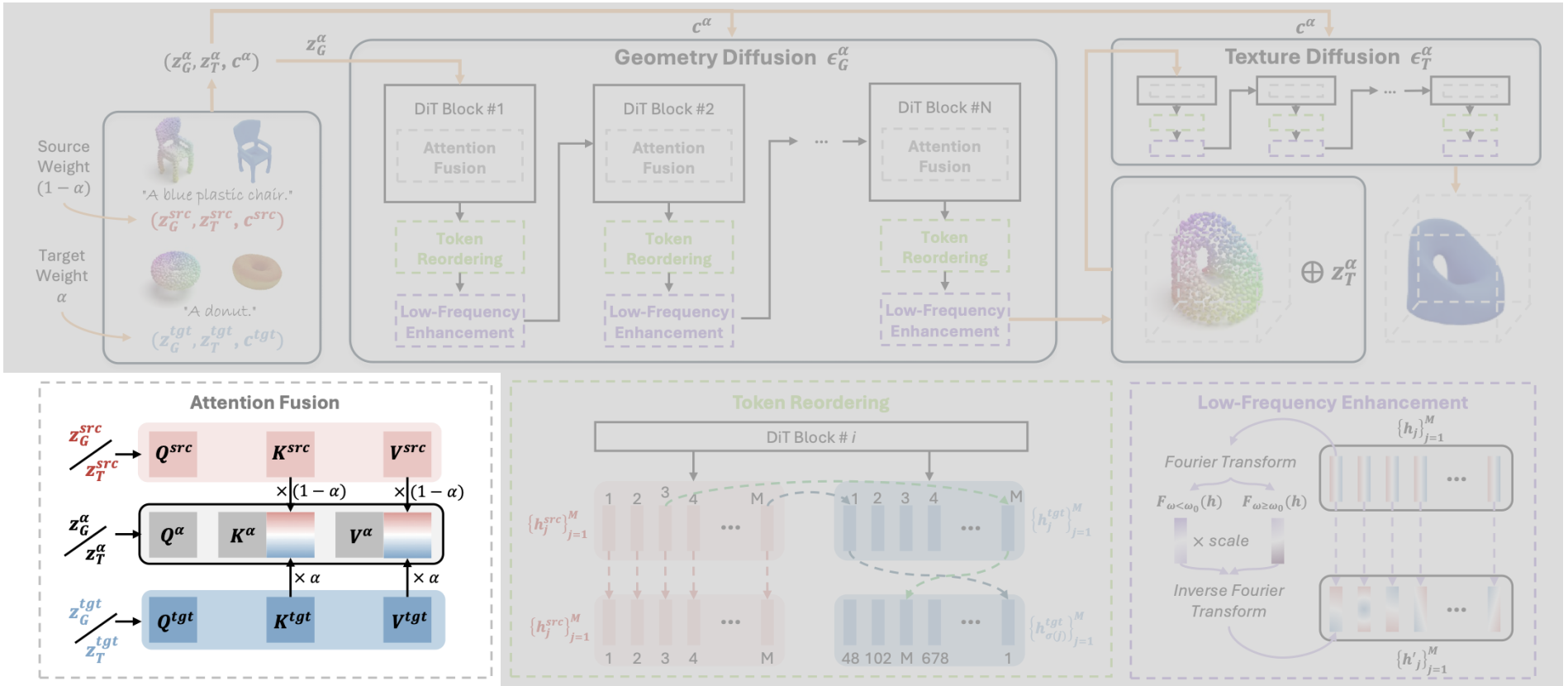
- To overcome these challenges, we propose a method for 3D regenerative morphing using a 3D diffusion prior. Unlike previous methods that depend on explicit correspondences and deformations, our method eliminates the additional need for obtaining correspondence and uses the 3D diffusion prior to generate morphing.

Method



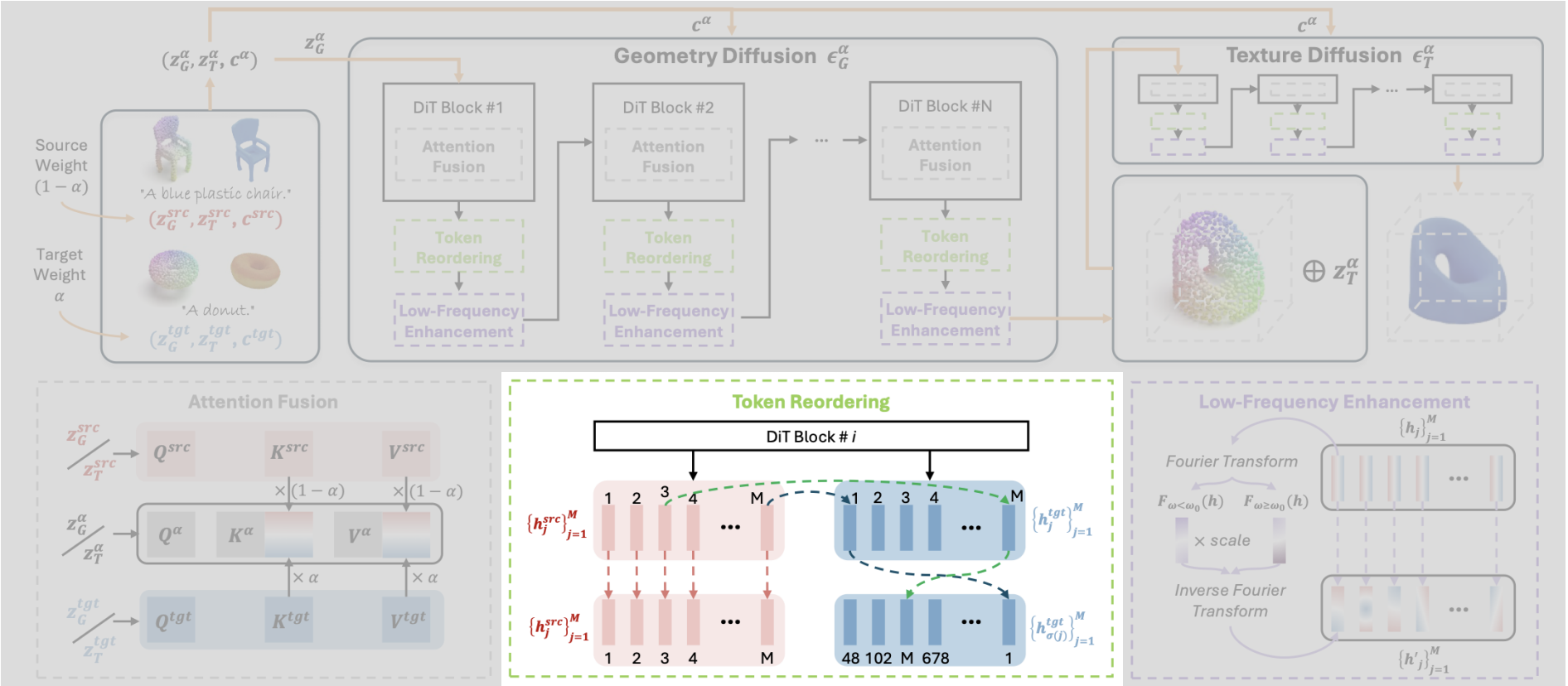
- Specifically, we first introduce a 3D diffusion model and interpolate the source and target information at three levels: initial noise, model parameters, and condition features.

Method



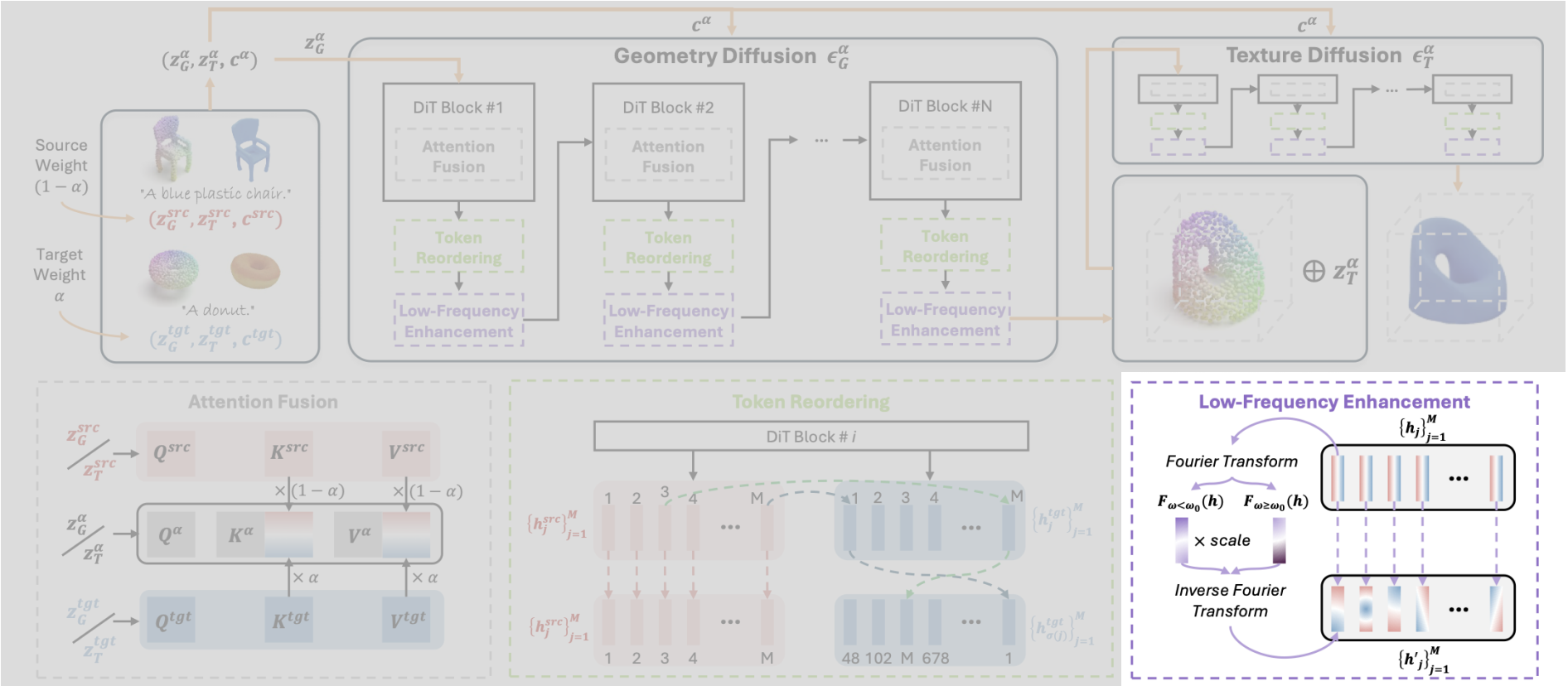
- We then explore an Attention Fusion strategy to generate smoother morphing sequences.

Method



- To further improve the plausibility of semantic interpolation and the generated 3D surfaces, we propose two strategies: (a) Token Reordering, where we match approximate tokens based on semantic analysis to guide implicit correspondences in the denoising process of the diffusion model.

Method



- (b) Low-Frequency Enhancement, where we enhance low-frequency signals in the tokens to improve the quality of generated surfaces.

Experiments

- Experimental results show that our method achieves superior smoothness and plausibility in 3D morphing across diverse cross-category object pairs, offering a novel regenerative method for 3D morphing with textured representations.

Thank you!

- More results: https://songlin1998.github.io/Textured-3D-Morphing/
- Following Project: Dense Semantic Matching with VGGT Prior