Seoha Kim

RESEARCHER ON 4D SCENE RECONSTRUCTION

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Summary

Research Interest	4D Reconstruction, Scene Understanding, Robotic Perception
Current Focus	4D Reconstruction with Egocentric Video, 4D Video Understanding

Publications

Per-Gaussian Embedding based Deformation for Deformable 3D Gaussian Splatting   *2024*

Jeongmin Bae*, **Seoha Kim***, Youngsik Yun, Hahyun Lee, Gun Bang, Youngjung Uh   *ECCV 2024*

- This paper aims to represent 4D Gaussian Splatting employing per-Gaussian deformation. Existing coordinate-based deformable Gaussian splatting fails to reconstruct dynamic scenes accurately due to the capacity limitations of the deformation field. The method solves the problem using per-Gaussian latent embeddings to predict deformation for each Gaussian and achieves a clearer representation of dynamic motion.

Sync-NeRF: Generalizing Dynamic NeRFs to Unsynchronized Videos   *2024*

Seoha Kim*, Jeongmin Bae*, Youngsik Yun, Hahyun Lee, Gun Bang, Youngjung Uh   *AAAI 2024*

- This paper aims to reconstruct 4D dynamic scenes from the *unsynchronized* multi-view videos. In the unsynchronized setting, the existing dynamic NeRFs fail to reconstruct the dynamic scene and struggle to fit even the training views. The method proposes learnable time offsets for adjusting temporal gaps in the training views and introduces two approaches for modeling temporal embedding.

Education

Yonsei University   *2022 - 2024*

M.S. in Artificial Intelligence supervised by Prof. Youngjung Uh   *Seoul, South Korea*

Yonsei University   *2015 - 2021*

B.A. Double major in Business Administration and Cognitive Science   *Seoul, South Korea*

Work Experience

Machine Learning Engineer, Plask   *2021.3 – 2021.8*

- Improving the accuracy of 3D pose estimation from videos, reviewing and implementing State-of-the-Art 3D papers.

Data Scientist Intership, Hyundai Mobis   *2019.9 – 2020.2*

- Improving the accuracy of defect classification on 3 kinds of structured factory data:
  Vibration motor noise, CT pattern, and auto-insert solder line process data.

Industrial Projects

ETRI (Electronics and Telecommunications Research Institute)   *2023.01 - 2024.06*

ACADEMIC-RESEARCH COOPERATION

- Researching Dynamic Gaussian Splatting. It achieves high-quality novel view synthesis in dynamic regions introducing novel representation.
- Researching Dynamic NeRFs from the *unsynchronized* multi-view videos. It improves the ease of data preparation and the quality of the results.

LG Display   *2022.2 - 2022.12*

ACADEMIC-INDUSTRIAL COOPERATION

- Researching knowledge distillation for panel defects classification.
  It improves the accuracy of fine-grained image classification, distilling similarity between patch-level feature maps.

Patents

KR 10-2024-0043684	Method and apparatus for Dynamic Gaussian Splatting using embedding-based deformation	*2024*
KR 10-2023-0105173	Method and apparatus for representing dynamic neural radiance fields from unsynchronized videos	*2023*
KR 10-2020-0022362	Apparatus of diagnosing noise quality of motor	*2020*

Awards

AID Korea	**1st place Minister's Award** Animal Datathon Korea - Cow keypoint detection	*2021*
Kaggle	**Top 2% Silver Medal** Cassava leaf disease classification - Image classification	*2021*
SNU Hospital	**5th place** Sleep AI Challenge - Sleep stages classification through polysomnography result images	*2021*