Computer Graphics

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Computer Graphics

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- Introduction to TA
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Self Introduction

- PhD, Math. Dept., State Key Lab of CAD&CG, Zhejiang University
- Bsc, Mathematics Department, Zhejiang University.
- Associate Prof., State Key Lab. Of CAD&CG, Zhejiang University, 1993-1994
- Prof., State Key Lab of CAD&CG, Zhejiang Univ., 1995-2002

- Research Fellow, Hong Kong Technological University, 1995.
- Visiting Prof., Fraunhofer IGD, Darmstadt, Germany, June 1998-Dec. 1998
- Visiting Prof., CAMTech, Nanyang Technological University, Sept. 1999-Oct. 2000

Honors/Awards

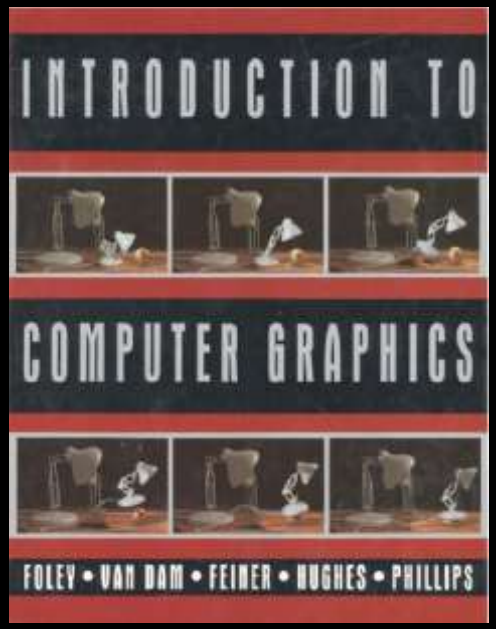
- National Excellent Yong Scientist Foundation
- NSF of China, 6 projects
- 863 High-Technology Plan
- Award of Science and Technology Development by China National Education Bureau.
- Outstanding Award by Shanghai Gov.

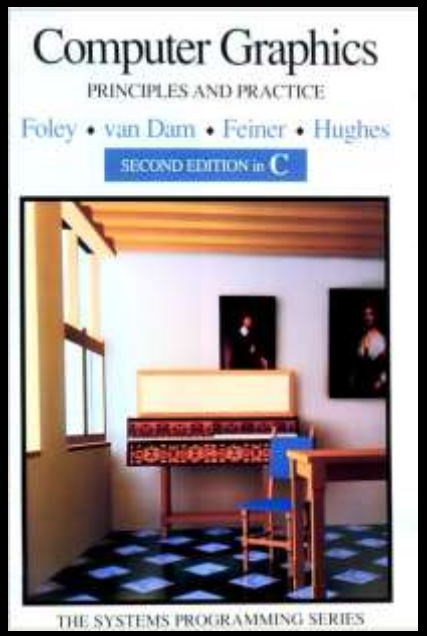
Research Interests

- Computer Graphics: theory and its applications
- Geometric Modeling: curves and surfaces, reconstruction of surfaces and objects
- Computer Animation: texture mapping, motion capture
- Scientific Data Visualization
- Digital Media Technology

Textbooks

- J. D. Foley,A. van Dam,S. K. Feiner,J. F. Hughes, R. L. Phillips. *Introduction to Computer Graphics*, Addison-Wesley, 1993





Course Description

- Started with the display of data on hardcopy plotters and cathode ray tube screens soon after the introduction of computers themselves.
  - Now Liquid Crystal Display/Plasma Display
- Include the creation, storage, and manipulation of models and images of objects.
- These models come from a diverse and expanding set of fields, and include physical, mathematical, engineering, architectural, and even conceptual structures, natural phenomena, and so on.

Course Description

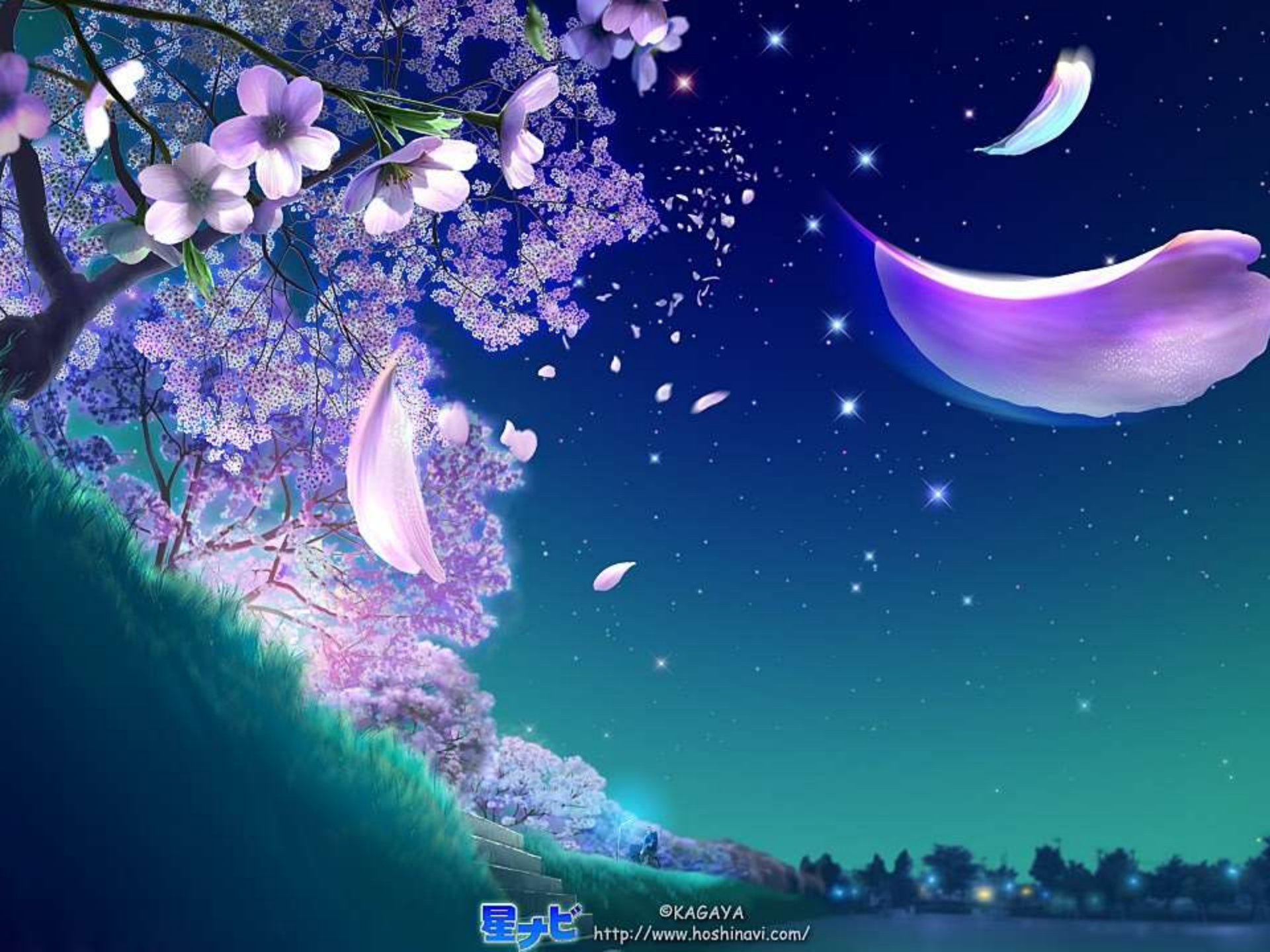
- Computer graphics today is largely interactive:
  - The user controls the contents, structure, and appearance of objects and of their displayed images by using input devices, such as a keyboard, mouse or touch-sensitive panel on the screen.
- Because of the close relationship between the input devices and the display, the handling of such devices is included in the study of computer graphics.

Aims of The Course

- Introduce the basic raster graphics algorithms for
  - drawing 3d primitives, geometric transformations in 2D and 3D space, viewing in 3D, representing curves and surfaces, visual reality and computer animation.
- Provides the basis for graphics algorithm design, CAD software development and game development.

Group Motion


Sea anemone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Celestial Exploring
art by KAGAYA
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New Trends in Graphics

- *Human Pose and Shape Reconstruction*

Kolotouros, Nikos, et al. "Learning to reconstruct 3D human pose and shape via model-fitting in the loop." ICCV 2019.

New Trends in Graphics

- *Human Pose Estimation*

Fang, Hao-Shu, et al. AlphaPose: Whole-Body Regional Multi-Person Pose Estimation and Tracking in Real-Time. TPAMI 2022

New Trends in Graphics

- *NeRF (Neural Radiance Fields) based 3D Reconstruction*

San Francisco Lombard Street

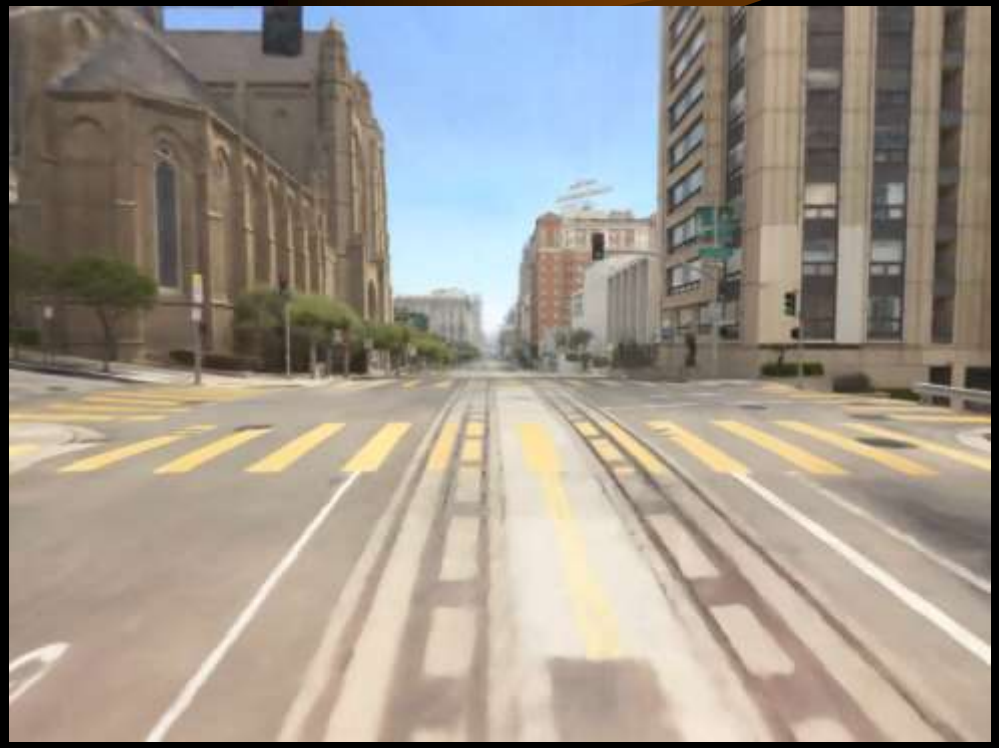
Reconstruction

Tancik, Matthew, et al. "Block-NeRF: Scalable Large Scene Neural View Synthesis." CVPR 2022.

New Trends in Graphics

- *NeRF (Neural Radiance Fields) based 3D Reconstruction*

San Francisco Grace Cathedral

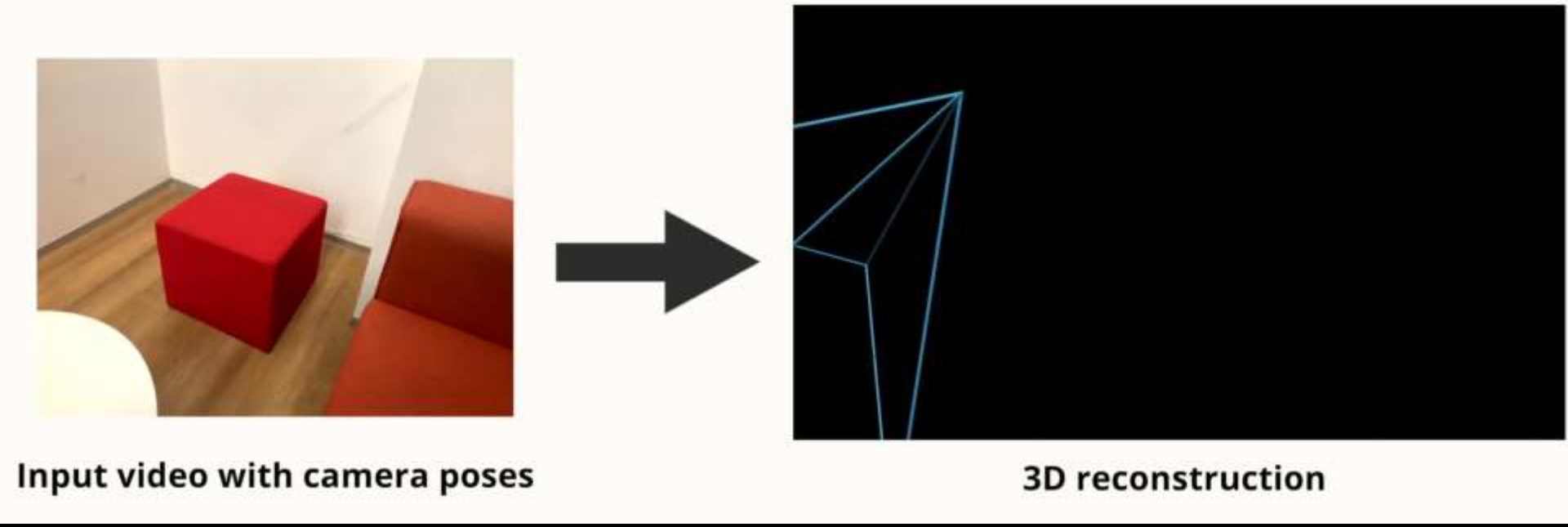


Reconstruction

Tancik, Matthew, et al. "Block-NeRF: Scalable Large Scene Neural View Synthesis." CVPR 2022.

New Trends in Graphics

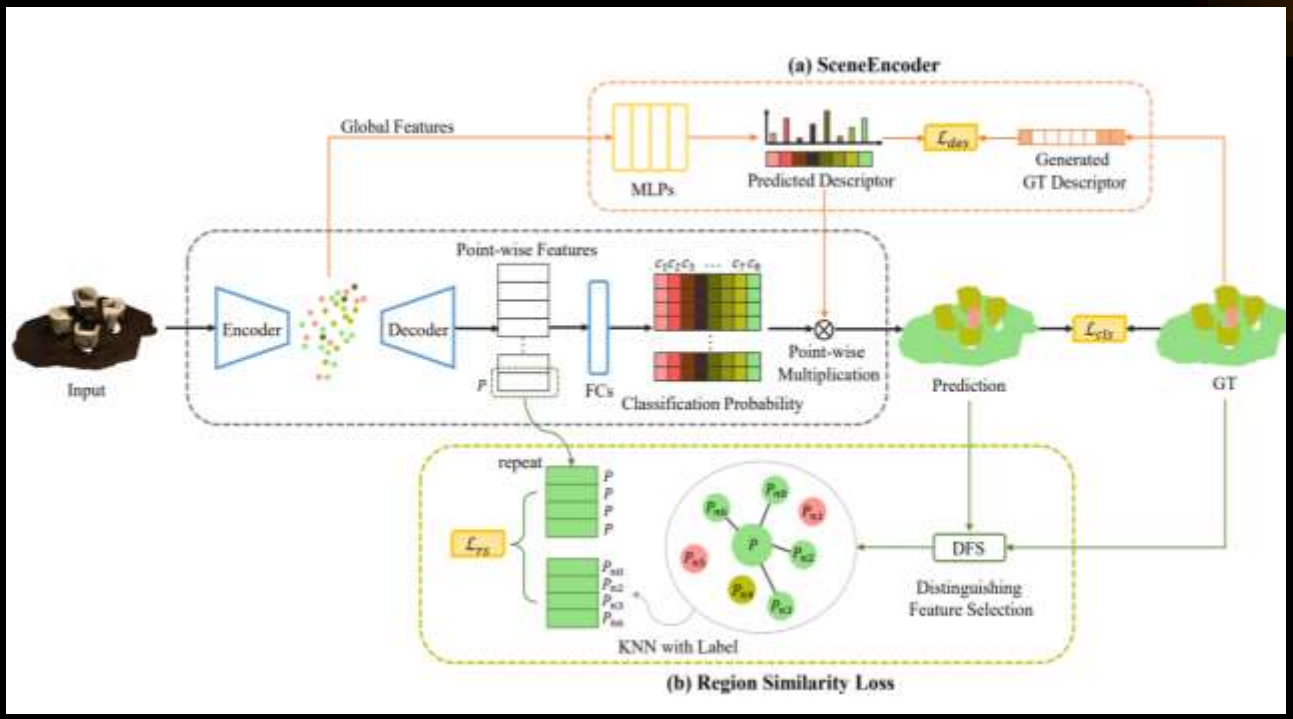
- *Real-Time 3D Reconstruction*

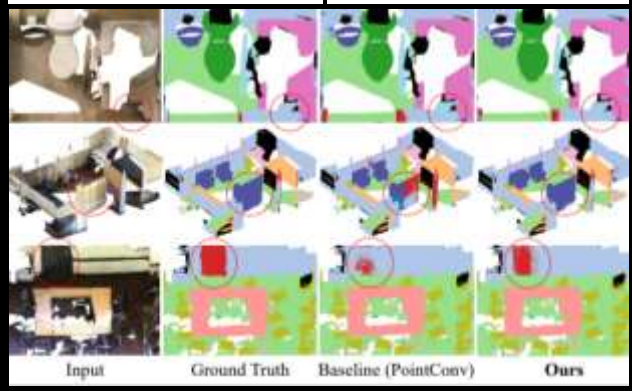


Sun, Jiaming, et al. "NeuralRecon: Real-Time Coherent 3D Reconstruction from Monocular Video."
CVPR 2021 Best Paper Candidate

New Trends in Graphics

- *Deep Learning for 3D Point Cloud*



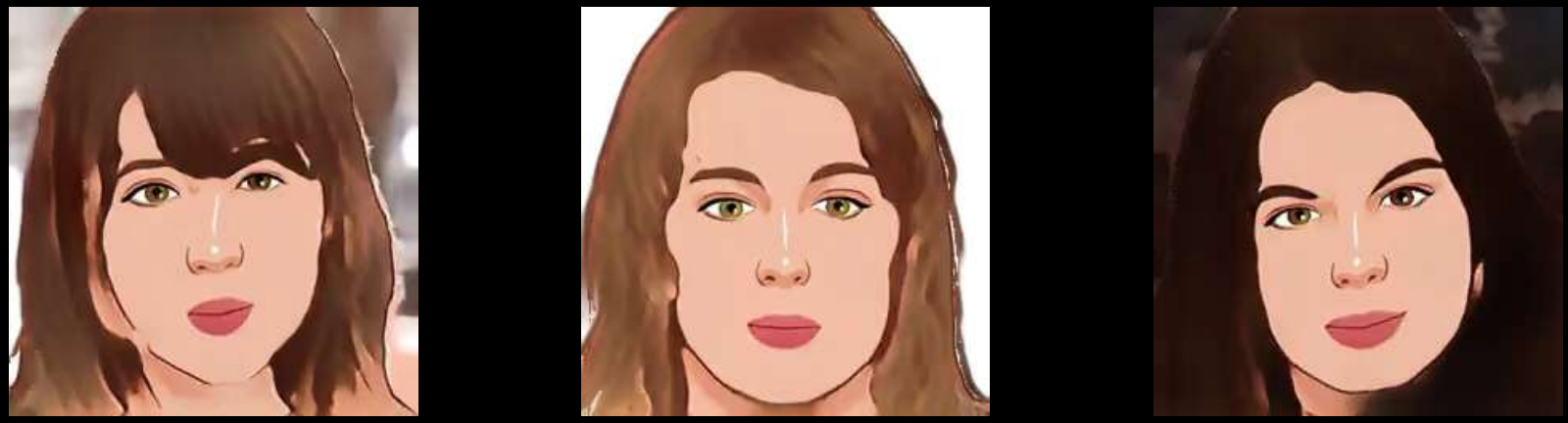


Xu, Jiachen, et al. "SceneEncoder: Scene-Aware Semantic Segmentation of Point Clouds with A Learnable Scene Descriptor." IJCAI 2020

New Trends in Graphics

- *Audio-driven Talking Face Generation*

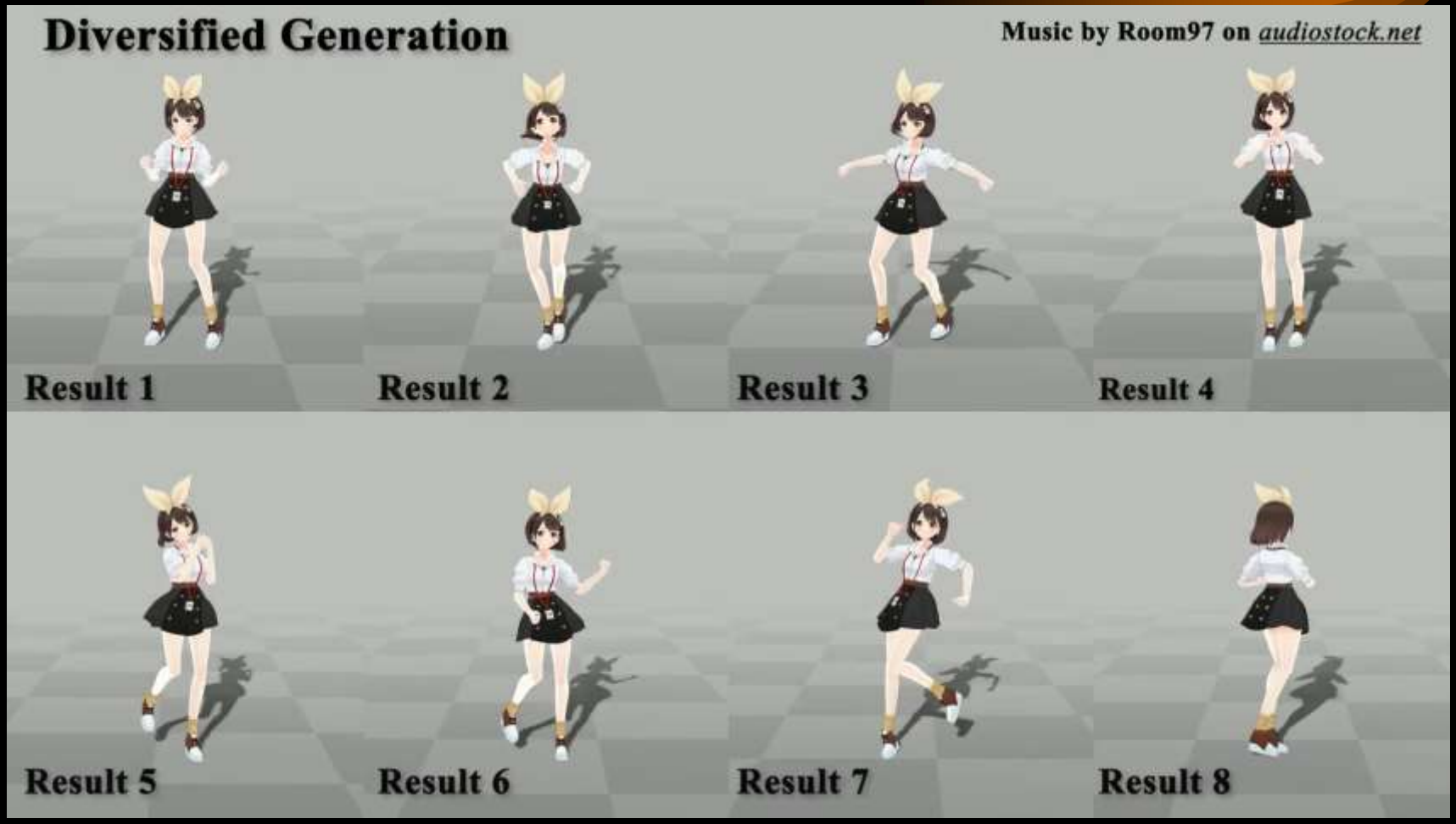
Lu, Yuanxun, et al. "Live Speech Portraits: Real-Time Photorealistic Talking-Head Animation." SIGGRAPH Asia 2021.



Yi, Ran, et al. "Animating Portrait Line Drawings from a Single Face Photo and a Speech Signal." SIGGRAPH 2022.

New Trends in Graphics

- *Music-driven Dance Generation*



Chen, Kang, et al. "ChoreoMaster : Choreography-Oriented Music-Driven Dance Synthesis." SIGGRAPH 2021.