The Hong Kong University of Science and Technology

Division of Arts and Machine Creativity (AMC)

AMCC5160, in Fall 2025/26

Course code: AMCC5160 (3 credits)
Course title: AI-Driven Animation and Video Generation
Abbreviated title: AI Animation & Video Gen
Course instructor: Harry Yang (Assistant Professor, AMC)
Target students: PG students in AMC with interests in AI & creative media
Class quota: 30
Grading requirement: Letter grades

Course description:

This course explores the intersection of AI and visual arts with a focus on animation and video generation. Students study modern models—Transformers, Diffusion/DiT, and autoregressive systems—and implement core components such as LSTMs, attention, and diffusion. Emphasis is placed on hands-on labs and projects that build practical skills for AI-driven media creation .

Enrolment requirement: N.A.

Course Intended Learning Outcomes
On successful completion of the course, students will be able to:
1. Explain principles behind modern AI models for video/animation.
2. Implement fundamental components such as LSTMs, attention, and diffusion.
3. Analyze limitations and quality issues in generative models.
4. Apply state-of-the-art methods to build creative projects.
5. Present technical and artistic work with clarity.

Teaching and learning activities:

- **Lectures (theory and model principles)**
- **Labs (implementation of components and simple models)**
- **Project-based assignments (midterm & final)**
- **Self-study (~6 hours/week expected)**

Planned Assessment & Weightings:

Assessment	Percentage
Assignments (implementation exercises)	20%
Midterm project & presentation (simple image generator):	30%
Final project & presentation (advanced video model)	50%

Weakly Course Outline

Week	Topics	Briefly outline what this topic will cover *(Include reading assignments if available)*	Indicate which course ILOs this topic is related to *(Write CILO-1, CILO-2, etc.)*

1	Intro & AI fundamentals	CNN/RNN/LSTM basics	CILO-1,2
2	Video representation	VAE, VQ-VAE, RQ-VAE	CILO-1,2
3	Transformers I	Attention mechanisms	CILO-1,2
4	Transformers II	ViT and applications	CILO-1,2
5	Diffusion & DiT	UNet-based samplers	CILO-2,3
6	Autoregressive models	GPT, LLaMA, VideoPoet	CILO-1,3
7	Midterm presentations	Simple image generator	CILO-4,5
8	Image models I	DALL·E, Stable Diffusion	CILO-1,4
9	Image models II	Fine-tuning, LoRA	CILO-2,4
10	Video models I	Make-A-Video, Sora	CILO-1,4
11	Video models II	Kling, VideoPoet	CILO-1,4
12	Final project work	Technical + creative development	CILO-4
13	Final presentations	Advanced DiT/autoregressive system	CILO-5

Student learning resources:

• Hands-On Generative AI with Transformers and Diffusion Models (Sanseviero et al., O'Reilly, 2024)
• Deep Learning (Goodfellow et al., MIT Press, 2016)
• Supplementary: Research papers (DALL·E, Stable Diffusion, Sora, Kling, DiT)