FLIPPING STATIC DRAWINGS TO TEXT-GUIDED SKETCH ANIMATIONS

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What ?

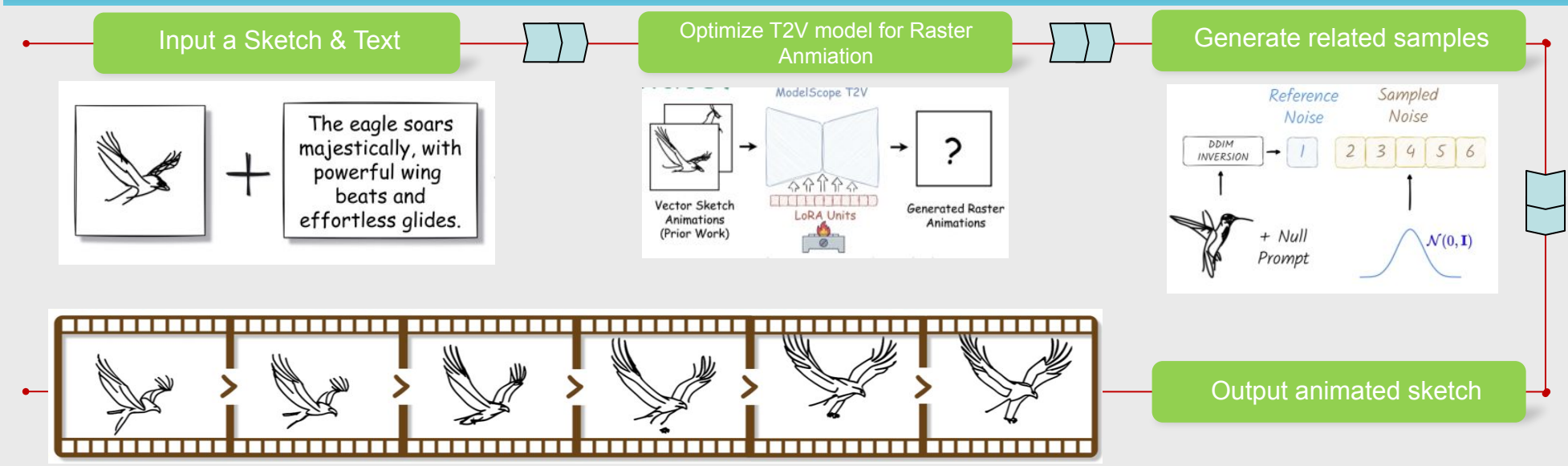
Sketch animation has long been a powerful medium for visual communication. However, current methods still face several challenges, such as:

- The labor-intensive nature of manual drawing.
- The absence of T2V models capable of generating authentic hand-drawn sketches; instead, most existing models merely rely on reusing pre-existing vectors.

Why ?

- The ***FlipSketch*** system leverages ***text-to-video*** diffusion models to generate dynamic animations from a single static frame and a text prompt.
  - ➔ **Input:** A hand-drawn sketch and a motion description.
  - ➔ **Output:** A short sketch animation (~10 frames) where the object's movement aligns with the input description

Overview



Description

1. Data Collection & Preparation

- Use existing vector animation tools to generate data pairs consisting of: (i) text descriptions and (ii) corresponding sketch animation sequences.

2. Fine-tuning via LoRA

- Instead of retraining the entire ModelScope model, apply LoRA to the video diffusion model's 3D UNet.

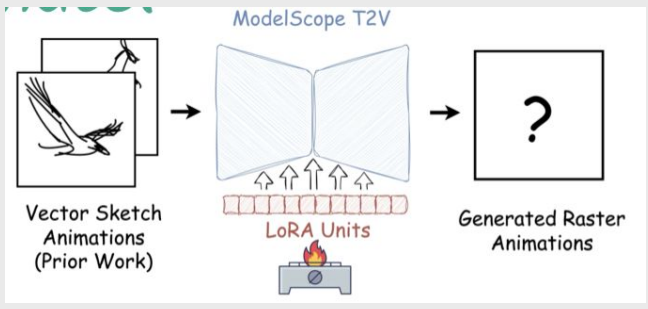


Figure 1. Pre-train LoRA for sketch animation generator

3. Reference Noise Extraction (DDIM Inversion)

- Encode the input sketch into the latent space to derive the reference noise.

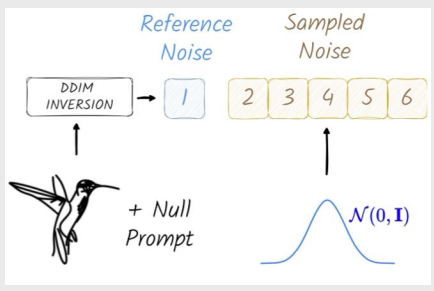


Figure 2. Invert Sketch to obtain reference noises for generation

4. Consistency Preservation & Motion Generation

1. **Repeat Frame Ordering:** Optimize noise for subsequent frames.
2. **Dual-Attention Mechanism:** Enable flexible motion while preserving stroke style and preventing blurriness.

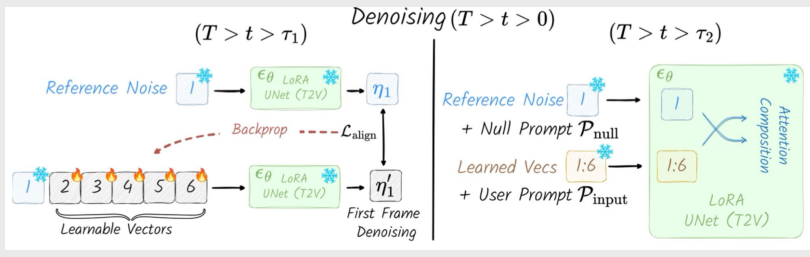


Figure 3. Generate all frames by attention composition with the first frame that has the reference noise.

5. Experiments & Evaluation

- Test across diverse subjects (animals, objects, characters).
- Compare against baselines like Live-Sketch and traditional I2V models.
- Evaluate using CLIP scores and user surveys.

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