**Deep Multi-Modal Unsupervised Line Art Pen Pressure Stylization**

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**Introduction and Backgrounds**

**Importance of Pen Pressure Stylization**

- Pen pressure stylization is de-facto essential processing affecting the aesthetic of line art.
- We propose an automatic pen pressure stylization method for raster images with unsupervised learning-based approach.

**Difficulties in Handling Pen Pressure**

- Pen pressure stylization requires time-consuming task
- Pen pressure stylization requires a high level of expertise
- Pen pressure stylization requires tablet equipment

**Limitations of Existing Approaches**

- Rule-based approaches require vectorization or vectorized line art
- Learning-based methods require scarce paired dataset

**Multi-Modal Unsupervised Pen Pressure Stylization**

**Pipeline of Proposed Stylization Method (inference procedure)**

- **Preprocessing**
  - Input Plain line art
  - Line depth estimator
  - Line normalization
  - Dilate
  - Rescaling

- **Stylization**
  - Style reference image
  - Style latent vector
  - Augmented CycleGAN

- **Postprocessing**
  - Output Stylized line art
  - Style reference image
  - Style latent vector

**Intensity Adjustment**

- The intensity of stylization can be adjusted by manipulating style latent vector (adding noise to known style latent vector).

**Demonstration**

**Demo Page Preview**

- Performance Evaluation
  - Multi-Modality
    - Style reference image
    - Cloudy style
    - Clear style
    - Clear and various style

- Generality
  - For anime-style line arts
  - For images drawn with mouse and text images