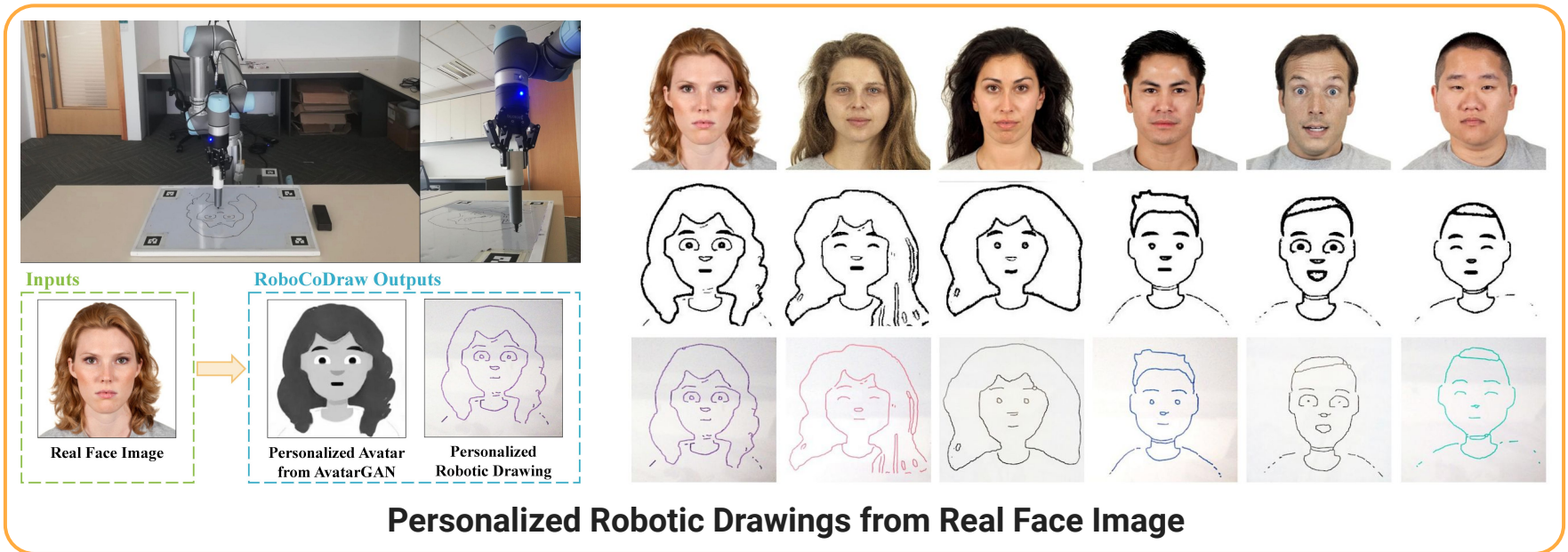


RoboCoDraw: Robotic Avatar Drawing with GAN-based Style Transfer and Time-efficient Path Optimization

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Motivation:

1. Robotic drawing— an attractive HRI task; 2. Challenging to make robotic art fun and creative

Proposed Two-Module RoboCoDraw System:

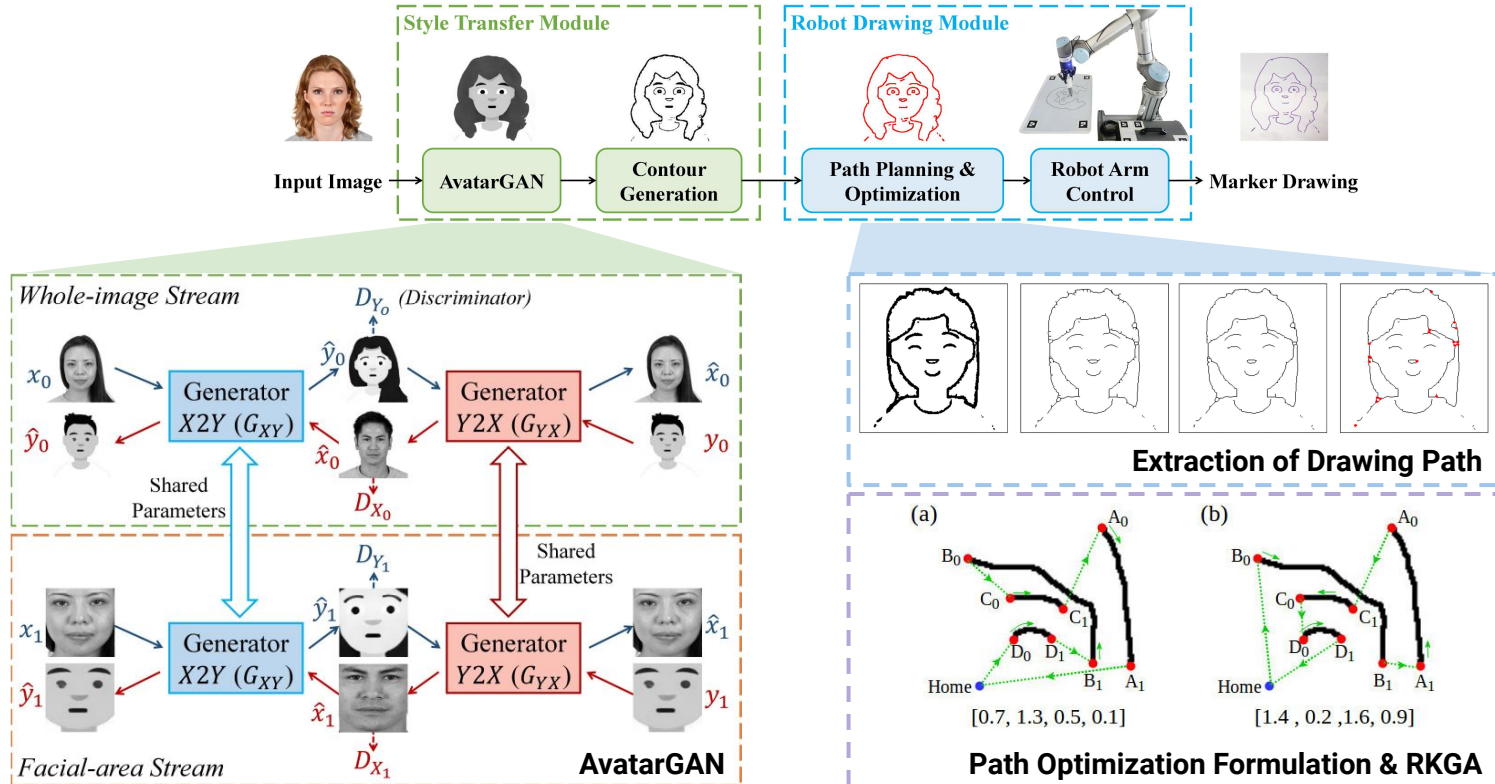
- Style Transfer module and Robot Drawing module
- Facilitates **efficient creation and drawing of personalized avatar sketches** on the robotic arm, given real human face images

* Open-sourced code available at <https://github.com/Psyche-mia/Avatar-GAN>

Main Contributions

- **AvatarGAN** (a two-stream CycleGAN) to map faces to avatars while preserving facial features
- **Robotic drawing system** that performs faithful style translation and time-efficient face drawing
- **Path optimization formulation** for the robotic drawing problem & **RKGA-based optimization algorithm**

Pipeline of the RoboCoDraw System



Experiment Results:

Style transfer: AvatarGAN creatively generates more diversified cartoon-avatars with better likeness

Path optimization: Our method has 17.34% improvement in fitness compared with greedy baseline

Great potential in public amusement and human-robot interactive entertainment applications