EditAnything: Empowering Unparalleled Flexibility in Image Editing and Generation

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ABSTRACT

Image editing plays a vital role in computer vision field, aiming to realistically manipulate images while ensuring seamless integration. It finds numerous applications across various fields. In this work, we present EditAnything, a novel approach that empowers users with unparalleled flexibility in editing and generating image content. EditAnything introduces an array of advanced features, including cross-image dragging (e.g., try-on), region-interactive editing, controllable layout generation, and virtual character replacement. By harnessing these capabilities, users can engage in interactive and flexible editing, giving captivating outcomes that uphold the integrity of the original image. With its diverse range of tools, EditAnything caters to a wide spectrum of editing needs, pushing the boundaries of image editing and unlocking exciting new possibilities. The source code is released at https://github.com/sail-sg/EditAnything.

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1 INTRODUCTION

Image editing is a computer vision fundamental task, playing a crucial role in various applications, e.g. photography and graphic design [3, 5, 7, 8, 13]. The ability to manipulate and enhance images has revolutionized the way we perceive and interact with visual content. With the advancement of generative models, e.g. GANs and diffusion models [1, 2, 9–12], image editing has become more accessible to both professionals and amateurs alike. However, despite the progress made in this field, there are still significant challenges that need to be addressed.

One of the primary challenges in image editing is achieving realistic and visually pleasing results while maintaining the integrity and authenticity of the image [3, 5, 7, 8, 13]. For instance, when applying modifications like object replacement or image retouching, it is essential to ensure that the edited image seamlessly blends with the surrounding content, without leaving significant traces of manipulation. Achieving this level of realism often requires sophisticated algorithms that can handle complex image structures, lighting conditions, and diverse visual content. Additionally, the increasing demand for real-time and interactive image editing further adds to the challenge, as it requires efficient algorithms capable of processing images quickly and accurately. Addressing these challenges is crucial to advancing the field of image editing and enabling a wide range of applications in visual media production and creative industries.

EditAnything is specifically designed to empower users with unparalleled freedom in editing and generating image content. This remarkable approach incorporates a myriad of powerful features, including cross-image dragging (e.g., try-on), region-interactive editing via text commands and mouse-clicking, controllable layout generation, and virtual character replacement for specific image object characters. These functionalities enable users to engage in image editing with unparalleled creativity and flexibility, giving captivating effects and innovations while preserving the integrity and authenticity of the image. EditAnything provides an extensive range of tools and features, allowing users to effortlessly adjust image elements or create entirely new content. With EditAnything, users can achieve highly realistic and visually pleasing results, catering to diverse editing needs and pushing the boundaries of image editing possibilities.

2 METHOD

The large-scale text-to-image diffusion models [6–8] have taken an enormous step of image generation in both quality and flexibility. To further enable a fine-grained layout control, we build the novel EditAnything upon the pre-trained Stable Diffusion [7], and add the segmentation mask generated by Segment Anything Model (SAM) [4] as the extra condition using the scheme of ControlNet [13]. Therefore, based on EditAnything, we can generate high-quality images or make specific regional editing while maintaining the given layout. Based on the inpainting model, we keeps the original image feature of unchanged region and applies Tile refinement [13] to ensure the realistic and quality of edited image. For the training-free image dragging and merging, we then utilize the

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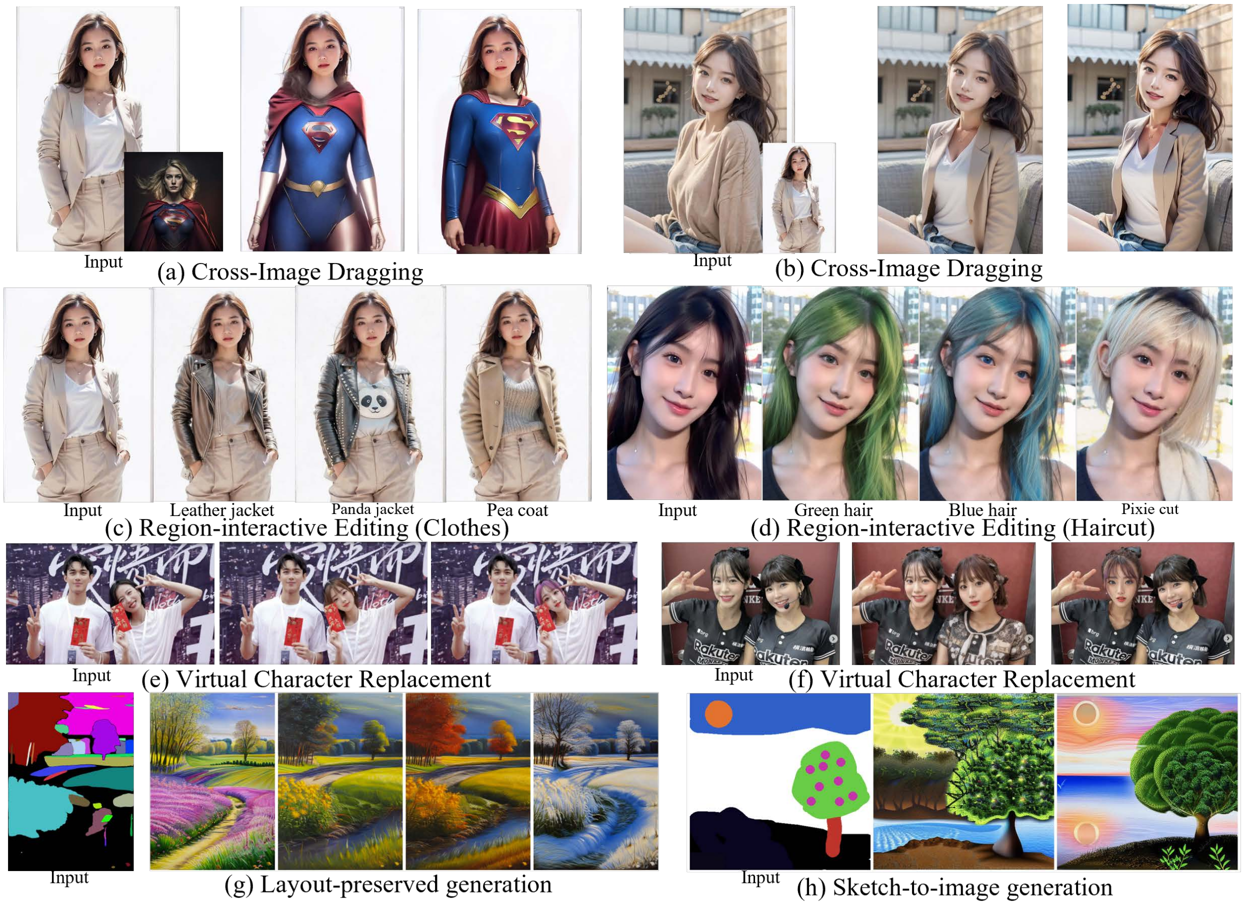

(a) Cross-Image Dragging

(b) Cross-Image Dragging

(c) Region-interactive Editing (Clothes)

(d) Region-interactive Editing (Haircut)

(e) Virtual Character Replacement

(f) Virtual Character Replacement

(g) Layout-preserved generation

(h) Sketch-to-image generation

Figure 1: EditAnything (controllable layout generation includes layout-preserved generation and sketch-to-image generation)

reference image as another control and employ the cross-attention mechanism and the cross-region adaptive normalization to aggregate semantic information to edited regions, where the proposed layout control is a helpful constraint to keep the generated images consistent and harmonious.

3 EXPERIMENTAL RESULTS

Cross-Image Dragging. EditAnything redefines image editing with its groundbreaking cross-image dragging functionality, enabling seamless merging of regions from different images without training. Users can effortlessly blend objects or areas from one image into another, expanding their creative possibilities. Fig.1 (a) showcases EditAnything's ability to smoothly drag Superman's costume onto another person. In Fig.1 (b), EditAnything transcends pose differences, transferring a front-standing shirt from a reference image to a side-sitting person in the target image. This flexibility frees users to explore limitless potential and create stunning images beyond the constraints of individual photographs.

Region-Interactive Editing. EditAnything revolutionizes region-interactive editing. Leveraging image layout maps, EditAnything empowers users to seamlessly edit and generate image regions. Using class-agnostic segmentation masks generated by the Segment Anything model, users can effortlessly manipulate image regions through text inputs or mouse-clicking. This interactive capability unleashes users' imagination, enabling easy editing of clothing, hairstyles, and more, as shown in Fig.1 (c) & (d).

Virtual Character Replacement. EditAnything, in conjunction with a specific LORA model, offers the capability of performing real-to-virtual character replacements, prioritizing privacy protection. This unique functionality caters to a wide range of image editing requirements while preserving personal privacy. With EditAnything's controllable image layout generation, users can seamlessly transfer facial features, body postures, and expressions to virtual characters while maintaining privacy. The Tile model enhances image details, consistency, and resolution, preserving the original style during the editing process, as shown in Fig.1 (e) & (f).

Controllable Layout Generation. EditAnything's controllable image generation is based on layout, leveraging the Segment Anything Model (SAM) to generate class-agnostic segmentation masks. By training a ControlNet using SAM, EditAnything gains the ability to control generative models like StableDiffusion, allowing for controllable layout-based image editing and generation. Edited images maintain structural consistency while adhering to the original layout, as illustrated in Fig.1 (g). Users can modify the seasonal style of an image while preserving the layout, such as plants. In Fig.1 (h), EditAnything also enables the generation of corresponding images based on user-provided layout sketches.

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