

# New AI tool lets users generate hi-res images on their own computer

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(a) SDXL Direct Inference



(b) SDXL Patch-based Inference



Examples of  $4\times (2048^2)$  generation based on SDXL. (a) Directly prompting SDXL to generate a  $4\times$  image. (b) SDXL inferences on non-overlapping patches at the original resolution. It fails, but reveals that the SDXL possesses prior knowledge of localized patches at higher resolutions. (c) MultiDiffusion fuses multiple overlapping denoising paths to generate higher-resolution images without edge effects, but lacks the global context for semantic coherence. (d) Our proposed DemoFusion achieves global semantic coherence in high-resolution generation. Credit: *arXiv* (2023). DOI: 10.48550/arxiv.2311.16973

A new tool promises to bring low-cost, high-resolution artificial intelligence (AI) image generation to a wider audience. It can achieve this without powerful computers behind a paywall.

Up until now, to create a high-quality AI image, users had to subscribe to a service like Midjourney or DALLÉ-3, or buy their own very powerful computers.

DemoFusion lets users generate a basic image using a freely available, open-source AI model like Stable Diffusion, then enhance it, adding more detail and features, at a much higher resolution. The necessary computing power is available on any mid-range gaming PC or a Mac M1.

Professor Yi-Zhe Song, whose group created the technique at the University of Surrey, said, "For the first time, our unique technique lets users enhance their AI-generated images without the need for vast computing power, or any re-training of the model.

"Digital art and imagery is a powerful medium which everyone should have access to—not just a handful of wealthy corporations. That's why we made DemoFusion publicly available. We believe it can enrich our lives, and everyone should be able to use it."

The new technique is described in the paper, "DemoFusion: Democratising High-Resolution Image Generation with No \$\$\$," [posted](#) to the *arXiv* preprint server.

To achieve high-resolution results using ordinary, open-source AI tools, the team first generated low-resolution images, then enhanced them. This is not an upscaling method—but instead coaxes more detail out of

the AI model, by working across the image in patches, improving detail and resolution by at least 16 times.

Professor Andrew Rogoyski, Director of Innovation and Partnerships at the Surrey Institute for People-Centred AI said, "AI can create stunning imagery for educational material, design and art—to name just a few examples. DemoFusion brings these capabilities to those who might not otherwise be able to afford them."

**More information:** Ruoyi Du et al, DemoFusion: Democratising High-Resolution Image Generation With No \$\$\$, *arXiv* (2023). [DOI: 10.48550/arxiv.2311.16973](https://doi.org/10.48550/arxiv.2311.16973)

Provided by University of Surrey

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