

Non-Photorealistic Ray Tracing with Paint and Toon Shading
(Technical Report)

Changing the Landscape: Enhancing Diversity in Animation and Graphics
(STS Research Paper)

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by

Megan Reddy

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Preface

How can the types of stories told in popular media be diversified? Since media influences thoughts, feelings, and actions, a lack of diversity can lead to stories that are unrepresentative of and stereotypical to the modern audience.

Path tracing is a technique for photorealistic rendering. Non-photorealistic methods, such as cartoon and painterly rendering, offer greater opportunities for storytellers to express their style. How can non-photorealism and path tracing be combined to render scenes in popular animation styles, such as that of Studio Ghibli? Our algorithm renders a 3D scene with a path tracer and determines if each pixel belongs to a foreground or background object. Foreground pixels are toon-shaded while background pixels are painted, following the style of Ghibli films. The algorithm stylistically renders global illumination effects, such as reflections, refractions, and caustics, with traditional NPR features such as object outlines and paint strokes. Since path tracing does not naturally produce non-photorealistic effects, this investigation suggests that advanced rendering algorithms can adapt to and supplement an artist's unique vision.

In order to produce stories that better reflect the modern audience, the animation and graphics communities are working to enhance diversity in the creative process. Diversity advocates create change by providing resources and guidance to diverse individuals and can compel media companies to take action and diversify talent working behind-the-scenes. Reformers include advocacy groups, professional organizations, fans, and industry professionals, who target large animation studios and media organizations that uphold traditional storytelling norms. By examining and identifying diversity strategies, proponents of change can pinpoint factors that influence onscreen diversity and make recommendations for the future of animated storytelling.

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