

Development of Seamless PBR Textures for 3D Amigurumi Doll Objects with an AI-assisted Image Processing Approach

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ABSTRACT

The demand for high-quality 3D assets in the animation and multimedia industry is increasing. One of the main challenges in developing 3D models is the availability of realistic and seamless PBR (Physically Based Rendering) textures, especially for fabric-based objects such as amigurumi dolls. This study aims to develop seamless PBR textures based on reference photos of amigurumi dolls using an AI-assisted image processing approach. The process begins with data collection in the form of amigurumi doll photos, which are then processed using generative AI technology to generate initial texture patterns. Next, Adobe Photoshop is used for refinement so that the textures meet seamless standards and PBR components such as diffuse/albedo, normal, and roughness maps. The results show that this approach can produce high-quality PBR textures efficiently compared to manual methods. These findings can be used as a reference in the production of textile-based 3D assets for animation, games, and interactive learning media.

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