

Title: A Comparative Study of AI-Generated 3D Models and Conventional Software-Based 3D Modeling Techniques: Accuracy, Efficiency, and Creative Potential

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Abstract: This comparative exploration differences between AI-generated 3D models and manually made models, with a focus on accuracy, efficiency, and production readiness. Two approaches were tested: text- and image-based AI tools (Edify-3D, Tripo AI) and conventional polygonal modeling in Autodesk Maya. A stylized low-poly war robot was modeled using both methods under the same design constraints. Evaluation considered build time, mesh topology, UV layout, editability, and suitability for animation workflows. AI tools generated results within minutes and that made them attractive for rapid prototyping. But the generated meshes showed structural weaknesses such as irregular topology, disconnected surfaces, and overlapping UVs, limiting their use in animation and real-time environments. Manual modeling required several hours but shaped clean geometry, consistent edge flow that are game and animation ready assets. From the results it became clear that there is a trade-off. The AI tools were useful for getting ideas out quickly, but they did not give the consistency required in a production setting. The manual process, although slower, gave models that were cleaner and easier to adapt. The study proposes that hybrid workflows, where AI provides initial drafts and human CG artists refine topology and details could balance efficiency with quality.

Keywords:

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