IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 2, December 2025
Impact Factor: 7.67

Automated 3D Visualization from 2D Design Plans

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Abstract: *The increasing shift toward digital design in architecture and engineering has created a strong need to convert old 2D blueprints into usable 3D models. Manually turning these drawings into 3D structures is slow, depends heavily on expert skill, and often leads to mistakes. To address these issues, this project introduces an automated system that uses deep learning to convert 2D architectural plans into structured 3D models.*

The workflow begins with cleaning the input blueprint through noise removal, binarization, and scale adjustments. A CNN-based segmentation model then identifies key elements such as walls, windows, doors, and other markings present in the drawing. These identified components are transformed into a layout graph, which helps the system understand the spatial arrangement of the structure. A reconstruction model then predicts height, dimensions, and geometric details required to generate a 3D model.

The final output is produced as a 3D mesh or a CAD-friendly model that can be edited and visualized using existing design tools. Tests conducted on various floor plans show that the system can create consistent and accurate 3D structures with much less manual effort, making it a practical solution for modern design workflows.

Keywords: *2D blueprints*

DOI: 10.48175/IJARSCT-30310