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Modelling and Layout of Farmhouse Using AutoCAD and 3D's Max Software

Vislavath Ganesh [a], Yejju Shivaraju [a], Vankudothu Satheesh [a], P Ranapratap [b]

U.G. Students, Department of Civil Engineering, Guru Nanak Institutions Technical Campus, Telangana, India[a]

Assistant Professor, Department of Civil Engineering, Guru Nanak Institutions Technical Campus, Telangana, India[b]

ABSTRACT: The Design and Modelling of Farm House using 3ds Max for 3D Modelling, Rendering and AutoCAD for drafting. To ensure representation of the Farm House design, AutoCAD is first utilized to develop full floor plans, elevations, and structural layouts. The 2D drawings are then transformed into realistic 3D models using 3ds Max, which adds textures, lighting, and materials to the visualization to create an aesthetic representation of the interior and exterior designs. The technical drawing capabilities of AutoCAD and the rendering capability of 3ds Max are combined to create realistic presentations and efficient design development, which aids in effectively communicating the design vision to clients.

KEYWORDS: 2D drawings, 3D visualization, Architectural works.

I. INTRODUCTION

Autodesk 3dsMax, 3D Max, Is A Professional 3D Computer Graphics Program For Making 3D Models, And Images. It Is Developed And Produced By Autodesk Media And Entertainment.[2] It Has Modelling Capabilities And A Flexible Plug in Architecture And Must Be Used On The Microsoft Windows Platform. It Is Frequently Used By Studios, And Architectural Visualization Studios. It Is Also Used For Movie Effects And Movie Pre-Visualization. 3ds Max Features Shades (Such As Ambient Occlusion And Subsurface Scattering), Dynamic Simulation, Particle Systems, Radiosity, Normal Map Creation And Rendering, Global Illumination, A Customizable User Interface, And Its Own Scripting Language.

3ds Max Interface Overview

The 3ds Max Interface Comprises Controls, Status Information, And Viewports, Where You Work And View Your Scene.

One Of The Most Important Aspect Of Using 3ds Max Is Its Versatility. Many Program Functions Are Available From Multiple Interface Elements. For Example, You Can Open Track View For Animation Control From The Main Toolbar As Well As The Graph Editors Menu, But The Easiest Way To Get To A Specific Object's Track In Track View Is To Right-Click The Object And Then Choose Track View Selected From The Quad Menu.

You Can Customize The User Interface In A Variety Of Ways: By Adding Keyboard Shortcuts, Moving Toolbars And Command Panels Around, Creating New Toolbars And Buttons, And Even Recording Scripts Into Toolbar Buttons.

The User Interface Is High DPI Aware, And Ensures That You Have The Optimal Experience With Your Display Hardware.

Note: Some Images Of The User Interface (Icons, Toolbars, Etc.) Found Within 3ds Max Help May Be Of Older Versions Of The Software.

1. User Account Menu
2. Workspace Selector
3. Menu Bar
4. Main Toolbar
5. Ribbon
6. Scene Explorer
7. Viewport Layouts

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8. Command Panel
9. Viewports
10. Max script Mini Listener
11. Status Line And Prompt Line
12. Isolate Selection Toggle and Selection Lock Toggle
13. Coordinate Display
14. Animation And Time Controls
15. Viewport Navigation Controls
16. Projects Toolbar
17. Topics In This Section

Workspaces

The Workspaces Feature Lets You Switch Quickly Among Any Number Of Different Interface Setups. It Can Restore Custom Arrangements Of Toolbars, Menus, Viewport Layout Presets, And So On.

1. Floating And Docking

You Can Easily Customize Your Workspace By Floating And Docking Part Of The Interface, Such As Panels, Windows, Menu, Toolbars, And The Time Slider.

2. Special Controls

3ds Max Uses Some Special User Interface Controls, Which Are Described In This Topic.

3. Additional Keyboard Commands

This Topic Describes Some Commands That Are Provided Only As Customizable Actions. You Can Assign Them To A Keyboard Shortcut, A Menu, Or A Button By Using The Customize User Interface Dialog.

4. Toggling Dialogs

In Most Cases, You Can Close A Dialog With The Same Command Used To Open It. This Applies To Any Combination Of Input Methods, Including Menu, Toolbar Button, And Keyboard Shortcuts. For Example, You Can Open The Render Setup Dialog By Choosing Rendering Render Setup, And Then Close It By Pressing F10 (Default Keyboard Shortcut). If A Dialog Is Available From A Menu, A Check Mark Appears Next To The Respective Command While It's Open.

1. To Start 3ds Max From The Command Line
2. Search 3ds Max Commands.
3. Lets You Search For Actions By Name.

II. LITERATURE SURVEY

Workflow in Virtual Reality Tool Development for AEC Industry by ann, Pratama and Dossick, Mutis, I., HartmT. [3] (2019) investigates how Architecture, Engineering, and Construction (AEC) firms integrate virtual reality (VR) technology into their workflows, particularly during design and pre-construction phases. The study identifies the main use of VR in AEC as building walkthroughs, supported by a variety of software tools ranging from quick, off-the-shelf solutions to in-house developments tailored to specific needs. Through semi-structured interviews, the authors analyze the challenges and workflows of VR implementation, highlighting how modern VR systems enhance visualization while requiring customized solutions for features like model annotation and multi-user environments.

Feasibility of augmented reality technology for communication in the construction industry. Advanced Engineering Informatics. Harikrishnan, A, Abdallah, AS, Ayer, SK, El Asmar, M and Tang, P 2021[4]: This research explores the use of virtual reality (VR) technology to enhance architectural education, specifically in building construction courses at Jordan University of Science and Technology (JUST), which traditionally rely on teacher-centered methods. The study developed BC/VR software that uses a 4D model (3D model with time) to simulate construction phases, providing immersive and non-immersive experiences for students. Through a structured questionnaire, the study evaluates the effectiveness of this VR tool in providing building construction information, increasing student enjoyment, and integrating with other courses. Results indicate that VR technology significantly outperforms traditional

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methods in all areas. The research also highlights VR's evolution and its potential to transform educational approaches by offering more interactive and engaging learning experiences Kelly L. Murdock is the author of "Autodesk 3ds Max 2021 Complete Reference Guide." This book is highly regarded for its comprehensive coverage of 3ds Max, making it suitable for both beginners and experienced users. It includes over 150 tutorials and step-by-step instructions on various topics, such as crowd simulation, particle systems, and MAXScript1.

The Complete Reference Guide is the ultimate book on 3ds Max, and like Autodesk's 3D animation software, it just gets better and better with each release. Whether you're new to 3ds Max or an experienced user, you'll find everything you need in this complete resource. The book kicks off with a getting started section, so beginners can jump in and begin working with 3ds Max right away. Experienced 3ds Max users will appreciate advanced coverage of features like crowd simulation, particle systems, radiosity, MAXScript and more. Over 150 tutorials – complete with before and after files – help users at all levels build real world skills.

Pradeep Mamgain is the author of "Autodesk 3ds Max 2021: Modeling Essentials, 3rd Edition." This book provides a structured approach to learning 3D modeling with 3ds Max, starting with the basics and progressing to more advanced techniques. Pradeep Mamgain is a self-taught digital artist, instructor, and consultant with a strong background in computer graphics. he Autodesk 3ds Max 2022 Fundamentals provides a thorough introduction to the Autodesk 3ds Max 2022 software that will help new users make the most of this sophisticated application, as well as broaden the horizons of existing, self-taught users.The guide instructs you on how to effectively use the software interface and navigate through the scenes. It explores the creation of 3D objects and how to bring in objects from other software such as Autodesk Revit, AutoCAD, and Civil 3D. Additionally, it teaches you to prepare the scenes for renderings by adding materials, lights, and cameras. Finally, the guide covers an understanding of various renderers included with the software, as well as image creation and animation techniques.The practices in this guide are primarily geared towards real-world tasks encountered by users of the Autodesk 3ds Max software in the Architecture, Interior Design, and Civil Engineering industries. Advanced topics such as character modeling, character animation, and rigging are not covered in this guide.

Rick Bartholomew is an interior designer with over forty years of practicum experience in residential, commercial, and furniture design. He has a Bachelor of Architecture and Master of Science (Interior Design) degrees from Oklahoma State University, of which, he formerly served as a professor teaching in the Interior Design program in the Department of Design, Housing, and Merchandising. Professor Bartholomew was tenured at OSU during his seventeen years of teaching experience. Rick currently conducts hand sketching and rendering workshops for schools of interior and architectural design, and one-on-one workshops for professional design firms.Rick's area of specialization is furniture design and presentation techniques. He has designed furniture pieces for exhibition and gallery showrooms in Oklahoma, Arizona, New Mexico, New York, Houston, and Chicago in addition to ownership of a copyrighted furniture collection inspired by Native American history and culture. Rick was a design consultant for a national retail fixture and custom furnishings manufacturer and his current work includes working with design and furniture manufacturing firms in developing furnishings and furniture components, as well as conducting sketching and colour rendering workshops across the country.Rick's passion, in addition to furnishings design, is dedicated to teaching students and practitioners the art and necessity of handsketching techniques and colour marker and watercolour rendering illustrations. He also strives to foster the importance of quality visual presentation composition and information graphics. His is personally inspired by Native American history and culture, the work of Frank Lloyd Wright, Georgia O'Keeffe, Nicolai Fechin, Art Deco, and contemporary design.

Hazard Recognition in an Immersive Virtual Environment: Framework for the Simultaneous Analysis of Visual Search and EEG Pattern and Kevin HanPHh D 2020[13]: A virtual safety training system using immersive virtual environments (IVE) to enhance workers' hazard recognition skills in construction sites. Workers wear virtual reality (VR) devices equipped with eye-tracking and brainwave-sensing technology to identify hazards in simulated construction settings. The platform analyzes workers' performance in hazard recognition tasks and provides personalized feedback, identifying areas where additional intervention is needed. This approach offers new insights into how a worker's brain and eyes function together during hazard recognition and aims to improve safety training by providing tailored, real-time feedback to workers.

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III. METHODOLOGY

Gathering client requirements, site analysis, and initial layout sketching are the first steps in designing farmhouse with AutoCAD and 3ds Max. Create 2D floor designs for the ground floor using AutoCAD, making sure that all sections and elevations meet to local construction rules and specifications for dimensions and operation. After everything is finished, Import the designs to 3ds Max in order to create walls, floors, and roofs can be extruded and architectural features like stairs and home furnishings can be added to the 3D model. Use V-Ray to apply realistic materials and textures, adjust lighting and surroundings, and generate excellent graphics. Present the design for remarks and finalize 2D drawings and 3D visuals for construction and presentation.

Analyzing site specifics, architectural preferences, and any other design guidelines that affect the finished product are also included in this phase. AutoCAD, which is perfect for producing accurate 2D architecture drawings, is used to draft the layout in the following stage. Prior to creating complete floor plans for the ground and first levels, the procedure entails establishing the proper units and scales. These blueprints make sure every component is precisely dimensioned and include wall, door, window, staircase, and room layouts. To improve clarity, annotations like labels and measurements are added, and layers are utilized to arrange the drawing's various elements. For usage in the 3D modelling stage, the finished layout is subsequently saved as a.DWG file.

The 2D layout is imported into 3ds Max for 3D modelling after it is complete. The proper scale and orientation are carefully maintained while importing the DWG file into the software. Layer-based organization of imported data makes processing easier. Making walls and defining structural components like floors, ceilings, are the next steps in establishing the farmhouse house base geometry. Boolean operations are used to incorporate door and window openings, and architectural elements like columns and modelling are added to improve the farmhouse appearance. Texturing and the application of materials are done after the 3D structure has been model. Using 3ds Max's Material Editor, realistic materials are applied to different villa components, and UV mapping is applied to ensure textures appear seamless. Because it adds depth and realism, lighting is a crucial component of this stage. Both artificial and natural lighting configurations are used, and sophisticated renderers like V-Ray or Arnold are frequently used to produce photorealistic results.

Rendering and visualization come next after the model and textures are ready. Key views of the farmhouse exterior and inside are captured by strategically placed cameras. The produced photos clearly display the farmhouse intricate design, and the render parameters are adjusted to guarantee high-quality output. To give a live view of the area, walkthroughs or animations can also be made if necessary Software such as Photoshop is used to post-process output photos. To improve the visual quality, brightness, contrast, and colour balance must be adjusted. Other effects like vegetation, sky, and ambient elements may be added to make the scene more lifelike.

Lastly, the results are checked against the original requirements. After rendered images and walkthroughs are reviewed and shared with stakeholders for advice. To make sure the finished design reflects the client's vision, any necessary changes are made in response to their feedback. High-resolution photos, animations, and 3D model files that are prepared for presentation or additional work are usually included in the deliverables. This thorough process ensures a precise and eye-catching representation of the farmhouse design.

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IV. EXPERIMENTAL RESULTS

Figures shows the result of the layout of farmhouse outed in AutoCAD Software.

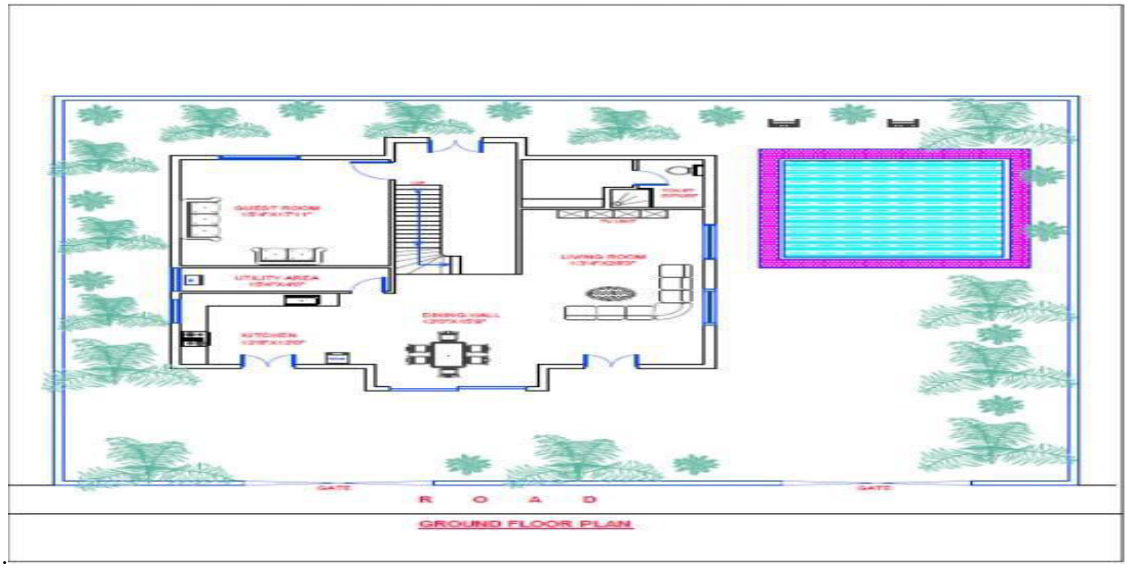
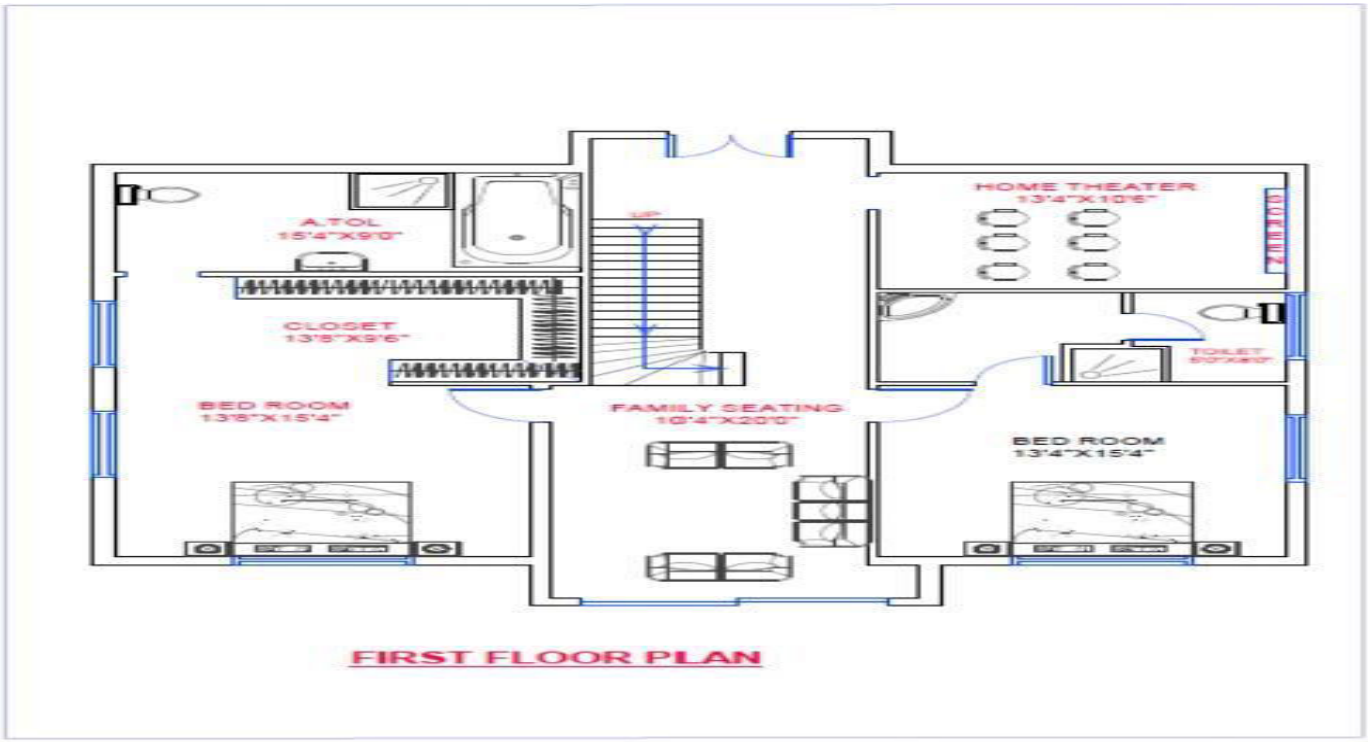


Fig. Shows the interface of the 3Ds Max software after importing the AutoCAD layouts



Fig, Show the interior sample designs of the our project

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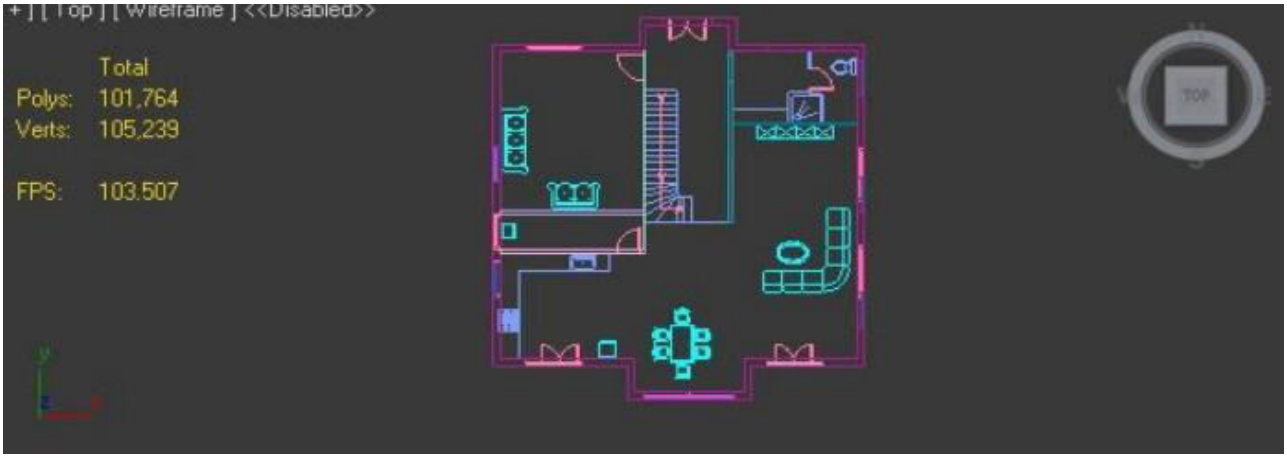

Final Fig. Shows the exterior elevation of the farmhouse

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V. CONCLUSION

The process of designing and visualizing a farmhouse using AutoCAD and 3ds Max combines precision, efficiency, and creativity. AutoCAD plays a critical role in ensuring accurate 2D layouts, which serve as the foundation for the duplex house design. On the other hand, 3ds Max brings the design to life with realistic 3D modelling, texturing, and rendering.

This workflow not only delivers precise and visually compelling results but also enhances communication with clients and stakeholders through high-quality visuals and walkthroughs. The flexibility to make iterative changes ensures the final output aligns with the client's vision. Together, AutoCAD and 3ds Max provide a powerful platform to create designs that are both functional and aesthetically impressive.

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