

2D, 3D & Walkthrough Visualization of Kalinga University

Main Building by CAD software

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Abstract: This paper presents a system for interactive walkthrough of 3D models and visualization of Kalinga University by using AutoCAD software. Virtual walkthrough of buildings have been in use for as long as three-dimensional modeling has existed. Compared to the traditional 2D drawing, this is a more effective technique to portray design. The majority of virtual tour designs are created as videos, which allows for very little user input and limits them to the path that the author wants the end user to take. I worked closely with the various AutoCAD commands during the course of the investigation. At that time, I had experience working with a variety of AutoCAD commands in 2D, 3D, walkthrough tools, and rendering capabilities. I also had the opportunity to conduct research on the various components of buildings and their designs. With the use of AutoCAD, 3D viewing, and walkthrough features, which aid in the realistic representation of the interior as well as exterior components of any particular structure, this paper offers a totally immersive experience for the user in the virtual space. My work on the study paper was appreciated by my team and the other department members. This study report, however, was written in a remarkably short amount of time. By reflecting my work for the designs of the 2D, 3D, and walkthrough visualizations of Kalinga University's main building, I have done my best to make it relevant.

Keywords: Virtual Reality, AutoCAD, Buildings, 3D Modeling, Walkthrough, Rendering

Introduction: A private institution of higher learning, Kalinga University was founded in 2011 and is situated in Naya Raipur, Chhattisgarh, India. Knowledge creation for a thriving and inclusive city is its primary motto. In central India, the Kalinga University in Raipur has become a centre of excellence for higher education. Strategically situated in New Raipur's smart city. This university has begun to establish a name for itself in the field

of education and is emerging as a bright light on the horizon of top-notch education. In Kalinga, learning and life go hand in hand. Student life includes participating in extracurricular activities, plays, conferences, workshops, lectures, and sporting events. Research, innovative problem-solving and critical thinking are key components of academic curricula. The university's improved facilities include a library, canteen, medical centre,

technology infrastructure, and placement services in addition to high-quality instruction. The 30-acre wifi campus at Kalinga University was thoughtfully planned to meet international standards. The faculty offices, computer labs, ordinary classrooms, laboratories, and a well-run theatre with a fully air-conditioned setting make up Kalinga University's main building.

Autodesk created and sells AutoCAD, a commercial computer-aided design (CAD) and drafting software program. The initial version of AutoCAD, which ran on microcomputers with inbuilt graphics controllers, was released in December 1982. Moreover, there are web and mobile apps for AutoCAD. Despite the fact that 3D modeling is possible, 2D drawings are the primary usage of AutoCAD [8]. As the times change, new software updates and the creation of more powerful technology take place.

One of the modern technologies that aids in the accurate depiction of any tasks is walkthrough. A walkthrough is a virtual tour that shows a client any model building or other structure without actually transporting them to the spot. With the aid of walkthrough real visualization of any model, such as (large buildings, bridges, hotels), [7] it is possible to observe the surroundings by physically moving about them. A 3D walkthrough is the technique of virtually touring any building using internet connectivity from any location at any time. Nowadays, it is widely used and the choice of customers [6]. Real estate professionals frequently use 3D walkthroughs while designing a client's home, office, or almost anything else. Before putting design concepts into practice, it is helpful to take a virtual tour of them. If you want to purchase a

home, for instance, during the pandemic. When you don't want to leave the safety and security of your home to enter an open house with other people but the estate rates are very cheap at that moment due to a critical condition, you take a 3D tour. Simply by uploading a virtual tour of the home, the real estate brokers or developers can make you feel as though you are seeing every room and paying attention to every detail that matters to you [10]. Also, you are free to evaluate it as many times as you like before making a choice on the purchase [9]. The much-needed gap between conception and implementation is filled by the 3D walkthrough. With the help of this amazing application, you can create 3D renderings of your designs and present them in a wholly accurate manner. Using a gorgeous home as an illustration, a 3D walkthrough animation can be made to allow the designer to show the customer the project's outside, interior, and surrounding areas. As has already been said, numerous sectors can profit from using a 3D tour. Now, let's concentrate on the uses of this lovely tool in real estate, architecture, and interior design.

Literature Review-

1. Alessandro Mulloni ,Daniele Nadalutti and Luca Chittaro et.al (15 April 2007) stated that; “Applications like indoor navigators, mobile tour guides, on-site monitoring and annotation of architectural designs at construction sites, evacuation instruction and counseling would all greatly benefit from interactive visualization of big 3D architectural models on mobile devices like PDAs. A huge architectural model cannot yet be handled by PDAs at an acceptable frame rate, despite their increasing power and some of them even having 3D hardware accelerators.

2. Fabio Remondino and Sabri El-Hakim et.al (7 Aug 2006) stated that; “This research discusses the main problems and potential fixes for the production of 3D models from terrestrial images. Close-range photogrammetry has long dealt with either manual or automatic picture measurements for accurate 3D modeling. While 3D scanners are increasingly employed in various application areas today, image-based modeling is still the most complete, inexpensive, portable, versatile, and popular technique. This paper shows the complete workflow for 3D modeling from terrestrial image data, accounting for multiple techniques and carefully going through each step.

3. Frederick p Brooks et.al (January 1987) stated that; “We are developing a tool for an architect and his customer to utilize for rapid prototyping of buildings by visually "walking through" them in order to refine specifications as part of our graphics research into virtual worlds. With roughly 8000 polygons, our first prototype represented the new UNC Computer Science building. The Adage Ikonas' BSP-tree software provided colored, shaded perspective views every 3 to 5 seconds as the user moved a pointer over floor plans displayed on the Vector-General 3300 in real-time.

Methodology: You must first conduct an inspection of the main building, and the next step entails research and data collection related to various building components with accurate measurements, including the building's actual length, width, and height, the sizes of its various rooms, including classrooms, auditoriums, labs etc. [11] and the actual

measurements of its stairs, windows, doors, and so on. But, once you have all the information, you must approximately draw up the building plan. Following that, you must begin sketching the blueprint in 2D on AutoCAD. You will need to use commands like line, rectangle, copy, move, fillet, mirror, erase, arc, text, offset, hatch, stretch, trim, block, point, scale, and others when drawing a 2D building in AutoCAD. Working with these commands enabled the creation of the 2D drawing of Kalinga University's main building, as seen in the figure below.



Following the conclusion of the 2D phase, AutoCAD 3D work has begun. Your drawing should be set up in the 3D workspace. To do this, you must first decide which work surface you want to start designing on by setting your X, Y, and Z axes in the appropriate orientations. Choose "3D Modeling" as the workspace. To design your model, use the modeling tools displayed in the 3D Modeling workspace [5]. You can explore a number of strong 3D modeling commands in AutoCAD, including press pull, extrude, sweep, union, subtract, etc. Press pull is a 3D fundamental command that enables you to choose a closed drawing object, such as a wall outline, and give it height by dragging your mouse to the required spot [1]. Extrude functions similarly to Press pull with the exception that you enter a numerical value

rather than moving your mouse. So, a 3D model can be created with the use of these commands, and then the model has been rendered to make it more realistic. In this manner, the main building of Kalinga University has been rendered in 3D as seen in the figure.



Fig: 3D Kalinga University's Main Building

Now after the completion of 3D, first we have to go to the top view and draw a circle with the help of circle command [14]. Walkthrough can be started by drawing a path for the camera with the help of "line" tool. Select the path for the camera and the target by using the any path command after which a setting is presented on the screen. The building's centre must then be located, clicked on, and then the "ok" button must be pressed. [2] Then, enter the duration of the video you want and choose the appropriate resolution based on our specifications. In this way you can get walkthrough visualization of Kalinga university main building.

Result: The use of AutoCAD software allows for the final representation of the Kalinga University main building. By this study paper, my teammate and I have learned more about the many commands and steps that are necessary to generate

the 2D, 3D, and walkthrough animations of the Kalinga University main building[4].

Conclusion: We can draw in 2D, 3D, and create walkthrough animations of any building, object, etc. using CAD software. Walkthrough is an advanced features. Walkthrough is an advanced feature of AutoCAD that satisfies the needs of the current generation by offering real-time visualization of any objects, assisting engineers, designers, and businessmen in choosing the models they desire. AutoCAD offers distinctive drafting tools for sketching engineering parts, designs, and infrastructure. Also, it reduces human error and facilitates accurate imaginative expression for users. With the use of commands like copy, mirror, stretching, and scaling, among others, simple modifications are achievable in AutoCAD [15]. It lets the user to create 2D drawings and 3D models with colors and other features. AutoCAD helps you produce high-quality work faster by reducing the time needed for modify and revisions. AutoCAD is also offered as a student version that is free to use for educators, students and institutions. Designers, engineers, drafters, and surveyors frequently utilize AutoCAD. Large design teams can collaborate on the same project at the same time, saving time and utilizing effective computer-aided design software.

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