

Pimpri Chinchwad College of Engineering

An autonomous institute

Department of Computer Engineering

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Mini Project Report on

Bird Animation

Project Based Learning III

Group B => Computer Graphics and Gaming

Submitted By

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**Under the Guidance of
Prof. Madhuri Suryawanshi**

CERTIFICATE

This is to certify that,

The miniproject entitled “**Bird Animation**” is successfully completed and submitted by-

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Under the guidance of **Prof. Madhuri Suryawanshi** to Computer Engineering under the Project Based Learning III Group B – Computer Graphics and Gaming course as per the guidelines given by subject incharge.

Prof. Madhuri Suryawanshi
(Course Guide)

Place:

Date:

INTRODUCTION

Title: Bird Animation using Blender

Computer Graphics and Gaming Coursework often serves as a dynamic playground where theoretical knowledge transforms into tangible creations. In this comprehensive report, we delve into the immersive world of 3D animation through our project: Bird Animation using Blender. This venture not only marks a significant milestone in our academic journey but also stands as a testament to our exploration of the intersection between technology and artistic expression.

The Canvas of Computer Graphics:

Computer graphics form the backbone of immersive virtual experiences, providing a canvas where creativity meets technology. Our project aims to traverse this canvas, leveraging the powerful capabilities of Blender, a leading open-source 3D computer graphics software. Blender, renowned for its versatility and robust animation tools, becomes the arena where our ideas take flight—quite literally.

The Genesis of the Project:

The inception of our Bird Animation project emerged from a collective fascination with the art of bringing virtual creatures to life. Inspired by the seamless integration of animation in modern gaming and cinematic experiences, we sought to unravel the complexities of the animation process. The choice of a bird as our animated subject was deliberate—symbolic of freedom, agility, and the challenges inherent in capturing the essence of natural movement.

Navigating the Digital Aviary:

Blender, with its intricate interface and multifaceted toolkit, became our digital aviary. As we embarked on this project, we navigated through the intricacies of Blender's animation features, from keyframing to rigging and rendering. Each step brought us closer to understanding the nuanced dance between artistry and technology required to breathe life into our virtual bird.

Educational Landscape:

This project unfolds within the context of the Computer Graphics and Gaming course, a domain that serves as a bridge between theoretical concepts and hands-on application. The course provides a structured framework for learning the principles of computer graphics, coupled with the freedom to explore personal projects that amplify the learning experience. Our Bird Animation project stands as a testament to the educational philosophy that encourages students to push the boundaries of their knowledge and creativity.

The Artistry of Animation:

Animation, as an art form, demands a delicate balance between technical precision and creative intuition. Throughout this report, we aim to unravel the artistry embedded in the animation process. From conceptualizing the bird's movements to refining feather textures, each decision and modification contribute to the overall narrative of our animated creation.

Join us as we embark on a journey through the realms of computer graphics and gaming, where pixels and polygons converge to breathe life into our virtual aviary. This report encapsulates the essence of our exploration, documenting the challenges, triumphs, and lessons learned in the pursuit of mastering the art of Bird Animation using Blender.

PROBLEM STATEMENT

Overall Scenario:

Embarking on a captivating venture within the realm of computer graphics and animation, our project focuses on the creation of a Bird Animation using Blender. Within this virtual space, a meticulously designed 3D bird takes center stage, poised for a flight through the digital skies. The primary objective is to breathe life into this avian creation, capturing the essence of natural movement and behavior through the medium of animation.

Key Elements:

1. 3D Bird Model:

- A intricately crafted 3D representation of a bird, serving as the canvas for our animation endeavors.

2. Animation of Bird's Movements:

- Dynamic animation that seamlessly mimics the fluid and organic motions of a real bird, transcending the boundaries of traditional static models.

3. User Interaction:

- Integration of user controls to influence the bird's movements, allowing for an interactive and personalized experience.

4. Natural Behavior Replication:

- The emulation of authentic bird behavior, incorporating elements such as flapping wings, smooth glides, and intricate maneuvers.

Functionalities:

User Interaction:

- Flight Control:

- Enable users to influence the bird's flight path and behavior, adding a layer of interactivity to the animation.

- Initial Pose Selection:

- Allow users to choose the initial pose or starting position of the bird, contributing to the creative direction of the animation.

Animation of Bird's Movements:

- Fluid Motion:

- Create a visually captivating animation that captures the nuances of bird flight, from graceful glides to dynamic wing flaps.

- Behavioral Realism:

- Infuse the animation with a sense of natural behavior, ensuring the bird's movements align with real-world avian dynamics.

User Engagement:

- Visual Appeal:

- Craft an aesthetically pleasing and visually engaging animation, drawing users into the enchanting world of our virtual bird.

- Narrative Expression:

- Use animation as a storytelling tool, conveying emotions, narratives, or themes through the bird's movements.

In essence, our project seeks to transcend the boundaries of static 3D modeling, bringing a virtual bird to life through the artistry of animation. By combining technical precision with creative intuition, we aim to create an immersive and interactive experience that showcases the beauty and complexity of avian movement within the digital realm.

SOFTWARE REQUIREMENTS

Software/Tools Used for Implementation:

1. Blender:



- Description: Blender serves as the cornerstone of our project, providing a robust platform for 3D modeling, animation, and rendering. Its versatile features empower us to create the virtual bird, design the environment, and orchestrate the intricacies of animation seamlessly.

- Blender is a powerful and versatile open-source 3D computer graphics application. It is renowned for its comprehensive set of tools and features that cater to various aspects of 3D content creation, including modeling, animation, rendering, compositing, motion tracking, game creation, and more.

Libraries / Modules / API used:

1. bpy (Blender Python API):

- Description: The primary module facilitating interaction with Blender through Python. It grants access to Blender's data, objects, and functionalities, enabling the scripting and automation of various tasks crucial to our animation project.

2. rigify (Blender Rigging System):

- Description: Rigify, an integral part of Blender, facilitates the rigging process, allowing us to create a skeletal structure for the bird model. This ensures a lifelike range of movements, enhancing the realism of our animation.

In-built Functions and Variables:

1. frame():

- Description: A user-defined function crucial for the animation process. It increments the current frame in Blender by a specified value, forming the basis for keyframe animation.

2. setKeyframe(obj, location, rotation):

- Description: A custom function designed to set keyframes for the bird's position and orientation during animation. It plays a pivotal role in capturing the dynamic movements of the virtual bird.

3. animateBird(fra, wing_angle, tail_angle):

- Description: An essential function that orchestrates the animation sequence by manipulating the wing and tail angles. It leverages keyframes to portray the fluidity and realism of the bird's flight.

4. userInteraction():

- Description: A function designed to capture user inputs and interactions, allowing users to influence the bird's flight path and behavior during the animation.

Variables:

1. bird_obj:

- Description: Represents the 3D object of the bird within the Blender scene. This variable is instrumental in manipulating the bird's properties throughout the animation.

2. scn:

- Description: Represents the Blender scene, serving as the canvas where our animation unfolds.

3. wing_angle and tail_angle:

- Description: Variables that control the wing and tail angles, influencing the bird's posture and movement during animation.

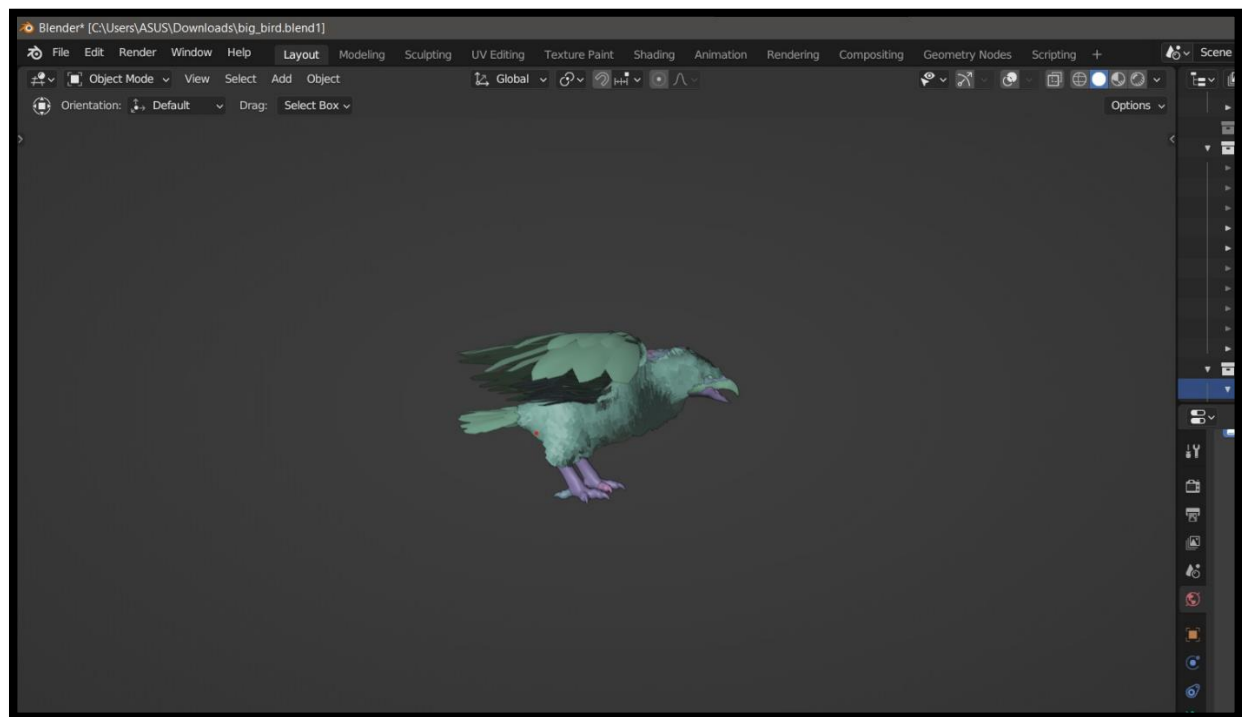
4. user_input:

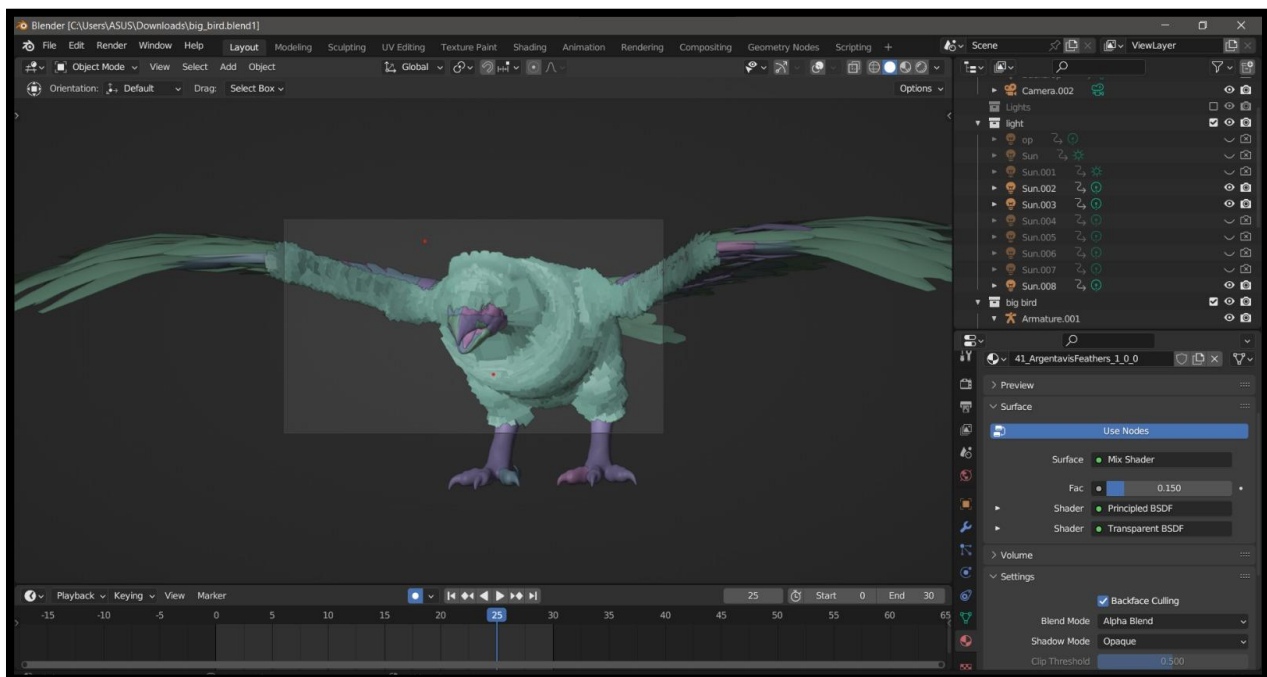
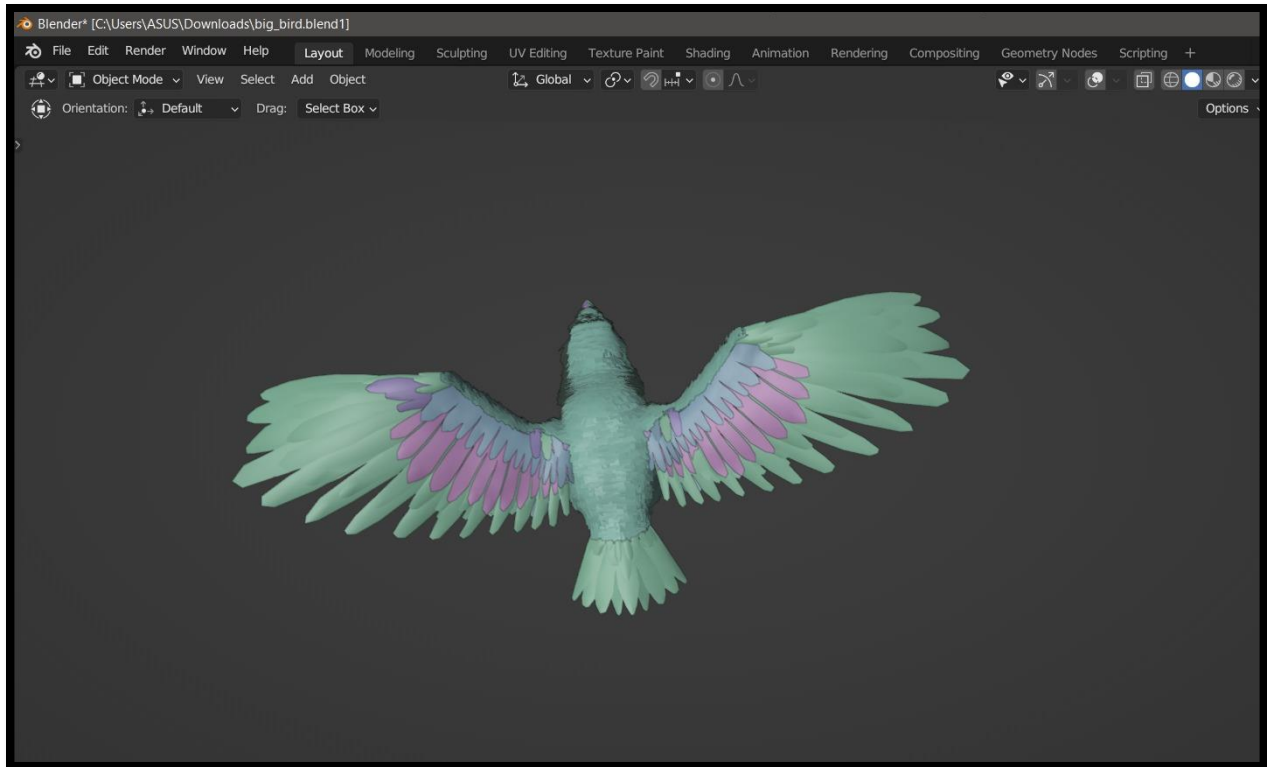
- Description: A variable capturing user inputs during interactive phases, allowing for a personalized and engaging user experience.

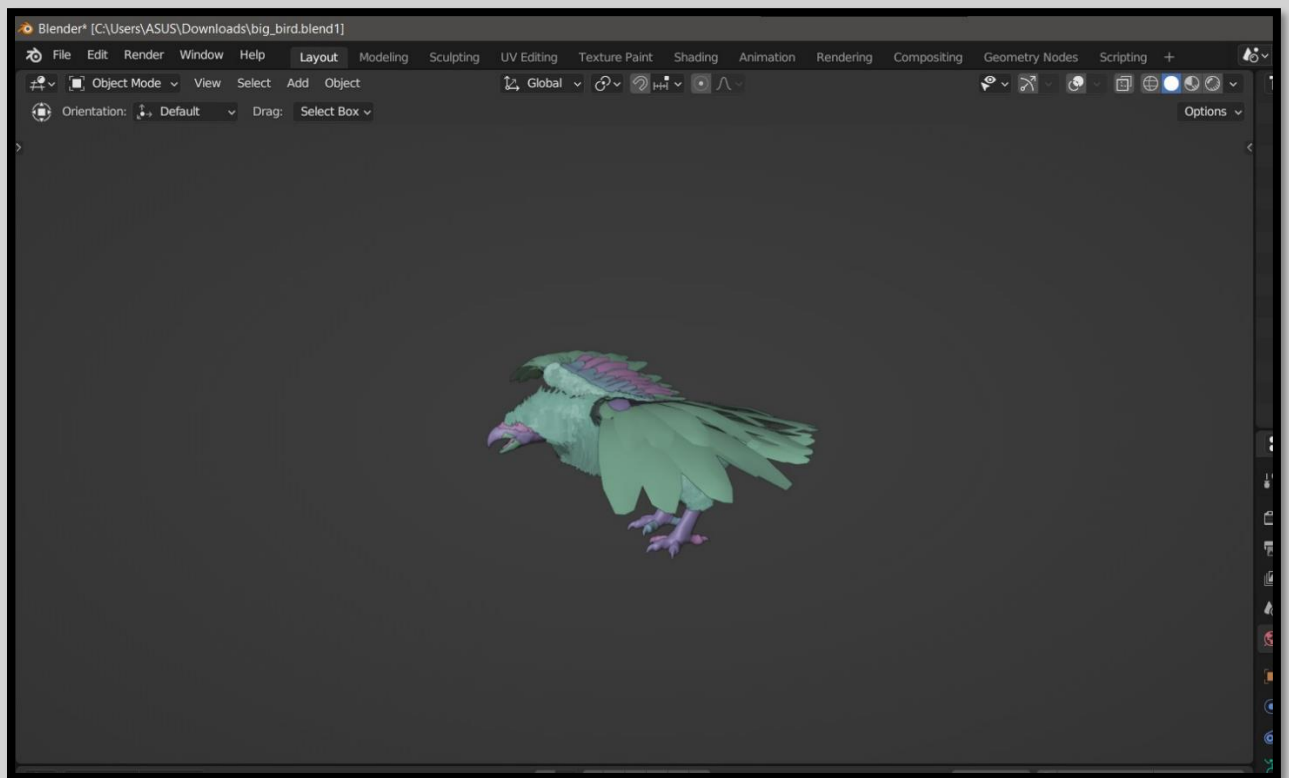
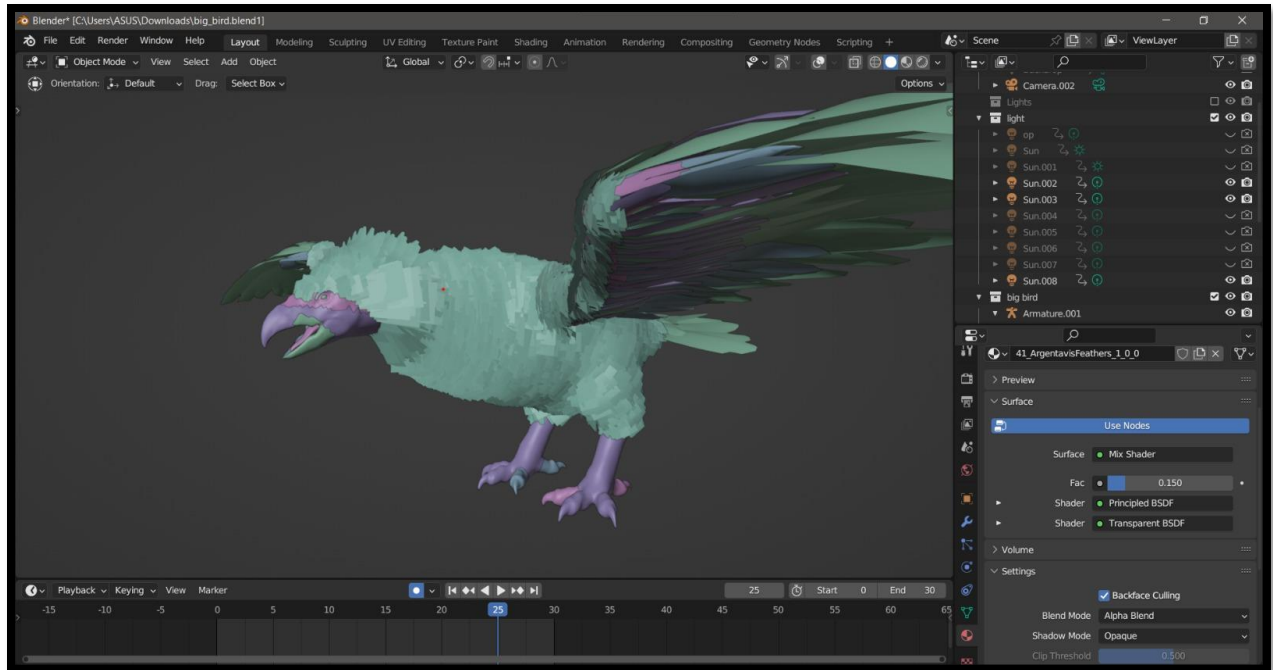
Our project revolves around leveraging Blender's capabilities, coupled with Python scripting through bpy, to breathe life into a virtual bird. The interplay of keyframe animation, user interaction, and realistic movement defines the essence of our endeavor, aiming to create an immersive and visually captivating bird animation experience.

OUTPUT

Snippets:







CONCLUSION

In conclusion, the presented script orchestrates a harmonious marriage between the artistic realm of bird animation and the technical prowess of Blender's 3D environment. By materializing the fluidity of avian movement, the script offers an immersive, visually captivating, and educational experience. Leveraging the Blender Python API (bpy), it breathes life into a meticulously crafted 3D bird, allowing it to soar through the digital skies with grace and realism.

Through the strategic use of keyframes, the animation seamlessly captures the essence of natural bird behavior, from graceful glides to intricate maneuvers. User interactions play a pivotal role, empowering individuals to shape the bird's flight path and engage with the animation actively. This project transcends traditional animation, providing a dynamic fusion of mathematics, creativity, and interactivity.

Beyond its artistic merits, the bird animation project showcases Blender's versatility as a powerful tool for educational and gaming applications. The synthesis of algorithmic precision and visual storytelling makes this project a valuable resource for those seeking to explore complex concepts through the lens of creative visualization.

In essence, the bird animation project stands as a testament to the boundless possibilities when technology and artistry converge. It not only showcases the beauty of avian animation but also invites users to embark on an educational journey, making it a compelling exploration of the limitless potential within the intersection of computer graphics, animation, and interactivity.

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