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CHESSE GAME: A SILENT BATTLE

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ABSTRACT

For centuries, chess has captivated minds across civilizations. From ancient India to modern-day grandmasters, this timeless game continues to inspire awe and challenge players of all ages. This Blender animation brings the timeless game of chess to life, using vivid 3D visuals and dynamic storytelling. It opens with a close-up of a pristine chessboard, each piece rendered with intricate detail, capturing the elegance and intensity of the game. As the animation unfolds, the pieces begin to move—each with purpose, as if driven by a life of their own. The pawns, rooks, bishops, knights, and royalty advance and retreat, revealing a powerful clash of strategy.

Through expert camera angles, the animation immerses viewers in the unfolding narrative of the match, shifting from wide shots of the board to close-ups of pivotal moves. The lighting shifts to heighten tension and drama, with shadows emphasizing the suspense of each critical decision. The pieces seem to convey emotion, reacting as they clash, get captured, or stand in defiance against the opponent.

The climactic finale showcases the final, swift moves leading to checkmate. In a breath taking conclusion, the remaining pieces stand motionless, capturing the victorious side's final triumph and the defeated king's resignation. This animation not only showcases the tactical brilliance of chess but also serves as a metaphor for the balance of power, sacrifice, and intellect. Through compelling visuals and an immersive narrative, this animation presents chess as more than just a game—it is a battlefield of minds and a journey of strategy and resilience, encapsulated in a visually stunning cinematic experience.

Chapter-1

INTRODUCTION

Chess has long been celebrated as a game of intellect, strategy, and artistic expression. It has long been a stage for epic battles of intellect, and few games embody this better like the iconic ninth round of the 1954 World Championship match between Vasily Smyslov and Mikhail Botvinnik, known as "The Passed Pawn," this masterpiece of strategy and execution remains a celebrated highlight of chess history. Using Blender, this animation project breathes life into this historic encounter, transforming a game played on a static board into a dynamic visual narrative.

Combining the timeless elegance of chess with the cutting-edge capabilities of Blender, this animation project brings the game's drama to life in an immersive 3D environment. From the careful placement of the chessboard to the intricate design of each piece, every detail has been crafted to create an engaging visual experience. The match, set against the tense backdrop of Moscow's World Championship, showcases the French Defense: Winawer, Retreat Variation, Armenian Line (C18), a complex and highly tactical opening. Botvinnik, the reigning champion, and Smyslov, the challenger, wove a tapestry of strategy, counter play, and brilliance. This animation focuses on key moments of the game, particularly Botvinnik's passed pawn—a decisive element that led to his eventual triumph.

Through Blender's advanced 3D modeling and animation tools, every move in this match is brought to life with unprecedented detail and artistry. The narrative emphasizes the tension, triumphs, and sacrifices that defined this historic battle. It centers around a dynamic chess game, unfolding with dramatic moves that lead to a thrilling queen promotion. The fluid movements of the pieces on a beautifully textured 3D board are complemented by camera angles and lighting that enhance the tension and strategy of the match. As pieces clash and capture one another, the animation conveys the intensity of the game's turning points. Each piece, from the elegant maneuvering of bishops to the relentless advance of the pawn, is animated to convey the intense psychological struggle of the players. Using Blender's powerful modeling and animation tools, the project showcases realistic physics, elegant piece transitions, and compelling storytelling. The camera captures pivotal moments, such as the rise of a pawn to a queen, symbolizing transformation and triumph.

This project is not just about creating a chess game but about visual storytelling—highlighting the emotional highs and lows of competition and strategy. With intricate details, smooth animations, and dynamic lighting, this Blender animation brings chess to life like never before, making it accessible and enjoyable for players and enthusiasts.

This project not only honors the legacy of "The Passed Tense" but also demonstrates Blender's ability to turn a legendary chess game into an immersive cinematic experience. Whether you are a chess enthusiast or an animation lover, this animation invites you to relive one of chess history's most fascinating games, highlighting the artistry and strategy that make chess the ultimate game of kings.

Chapter-2

SYSTEM REQUIREMENT SPECIFICATIONS

To successfully develop and render chess animation in Blender, specific software and hardware system requirements must be met. These specifications ensure optimal performance, smooth workflow, and high-quality.

2.1 SOFTWARE REQUIREMENTS

1. Operating System:

- Windows 10/11 (64-bit)
- macOS 11.0 or newer

2. 3D Modeling Software:

- Blender (version 3.4 or later) for modeling, texturing, and rendering.

3. Rendering Engine:

- Cycles (GPU-based ray tracing) or Eevee (real-time rendering) within Blender.

4. Driver Requirements:

- Updated GPU drivers (NVIDIA/AMD/Intel) for rendering acceleration.

2.2 SYSTEM REQUIREMENTS

1. Processor (CPU):

- Minimum: Intel Core i5-6600 or AMD Ryzen 5 1400.
- Recommended: Intel Core i7-9700K or AMD Ryzen 7 5800X for faster processing and simulations.

2. Graphics Processing Unit (GPU):

- Minimum: NVIDIA GTX 1060 (6GB) or AMD RX 580 (8GB).
- Recommended: NVIDIA RTX 3060/4060 (12GB) or AMD RX 6800

for high-resolution rendering.

3. Memory (RAM):

- Minimum: 8 GB.
- Recommended: 16 GB or more for handling large textures and complex scenes.

4. Storage:

- Minimum: 256 GB SSD (Solid State Drive) for faster file access.
- Recommended: 1 TB SSD for storing project files, textures, and backups.

5. Display:

- Full HD monitor (1920x1080) minimum.
- Recommended: 4K display for precise detailing and color accuracy.

6. Peripherals:

- Graphics tablet (e.g., Wacom) for precise modeling and sculpting.
- 3-button mouse for efficient navigation in Blender.

7. Power Supply:

- Reliable power backup (UPS) to prevent data loss during rendering

8. Networking Requirements:

- Stable internet connection for downloading reference images.

Chapter-3

SYSTEM DESIGN AND DEVELOPMENT

The system design and development of chess animation involves a structured approach to ensure an accurate, efficient, and visually compelling 3D model. The process begins with thorough research and planning, followed by modeling, texturing, and rendering stages, all executed using Blender.

3.1 SYSTEM DESIGN

The animation meticulously reenacts a historic chess game, emphasizing critical moves, including a dramatic queen promotion, and showcases cinematic effects to create an engaging and immersive visual experience.

1. Chessboard Creation

The chessboard was crafted as a 2x2m plane, subdivided into a perfect 8x8 grid. Alternating black-and-white textures to the squares, reflecting the classic chessboard design. Wooden texture was added which added a professional finish.

2. Chess Piece Modeling and Texturing

Each chess piece was modeled and textured to achieve lifelike aesthetics:

Modeling: Starting from basic geometric shapes, modifiers like Bevel and Subdivision Surface were applied to sculpt each piece with intricate details, including the distinct forms of pawns, knights, rooks, bishops, queens, and kings.

Texturing: Image textures provided surface detail, while the Shader Editor was used to add shine and glow effects. Brightness and contrast were adjusted to make the pieces visually striking against the chessboard.

3. Game Animation

The animation followed a historic game sequence, carefully choreographed to fit the 5 minute duration:

Chess pieces were positioned in their initial layout and animated using keyframes to replicate the recorded moves.

Camera transitions highlighted pivotal moves, including a tension-building sequence leading to the pawn promotion.

The queen promotion was dramatized with an emerging crown effect and smooth transformation from pawn to queen.

4. Collision and Destruction Effect

Captures and clashes between pieces were brought to life with advanced effects:

Fracturing: The Cell Fracture add-on was used to simulate breaking pieces into fragments upon capture.

Visibility Management: Captured pieces were made invisible post-collision to emphasize the fractured fragments.

Dynamic Interactions: Flying fragments added drama, while physics simulations ensured realistic motion and impact.

5. Camera Motion

The camera work was designed to create a cinematic and immersive experience:

A combination of tracking shots, zoom-ins, and overhead angles emphasized key moments.

Depth of field adjustments drew focus to critical moves, such as captures and the queen promotion.

Smooth camera transitions maintained visual continuity and narrative flow.

6. Sound Design

Sound effects and background music enhanced the animation's emotional impact:

Background Score: A thematic score underscored the tension, triumph, and strategy of the game.

7. Rendering and Post-Processing

Blender's Cycles engine was used for high-quality rendering:

Advanced rendering settings ensured optimal visual fidelity.

Post-processing effects, including motion blur, depth of field, and color grading, enhanced the cinematic quality.

Lighting adjustments were made to highlight the chessboard and pieces throughout the animation.

Every move is brought to life with intricate details, from the elegance of the opening to the dramatic queen promotion and final moments. The combination of realistic textures, dynamic lighting, and compelling sound design ensures a visually stunning and emotionally engaging experience.

This completed project is a tribute to the art and science of chess, blending technical excellence with creative storytelling to bring a historic game to life through Blender.

Chapter-4

METHODOLOGY AND IMPLEMENTATION

This section outlines the methodology and implementation process that was followed to create the 4-minute chess animation using Blender. The project involved integrating 3D modeling, texturing, animation, and post-processing to bring a historic chess game to life.

4.1 METHODOLOGY

The project was divided into the following phases:

- 1. Pre-Production and Planning:** Research was conducted on the chosen chess game to analyze move sequences and identify key moments such as captures and the dramatic queen promotion. A storyboard was created to map out the animation sequence, camera angles, and visual effects. Blender tools and techniques were identified to ensure efficient execution during the production phase.
- 2. Production:** The chessboard and pieces were created with precise dimensions to maintain realism. The animation of the game was implemented move-by-move, incorporating realistic physics for captures and collisions. Visual details were enhanced using textures, lighting, and dynamic camera movements.
- 3. Post-Production:** The animation was rendered using Blender's Cycles engine for high-quality output. Sound effects and background music were added to complement the visuals.

4.2 IMPLEMENTATION

1. Chessboard Creation

A 2x2m plane was modeled to represent the chessboard. The plane was subdivided into 64 squares (8x8 grid), with black-and-white textures were applied. A border was added to frame the board, and subtle roughness was incorporated for a realistic touch. Lighting was strategically positioned to highlight the chessboard's textures.

2. Chess Piece Modeling

Each chess piece was individually modeled using Blender's geometric tools.

Base Shapes: Cylinders and spheres were used as starting points for the designs of pieces like pawns and bishops.

Detailing: Modifiers like Bevel and Subdivision Surface were applied to achieve smooth surfaces and intricate details. Textures were added to create realistic material effects, while the Shade Editor was used to enhance shine and glow on each piece.

3. Animation of the Game

The chess game was animated move-by-move using key frames.

Setup: Pieces were positioned on the board in their initial arrangement.

Movements: Key frame animations were used to move pieces fluidly between positions.

Queen Promotion: The pawn promotion to a queen was animated with a crown emerging from the pawn, transitioning seamlessly into the queen.

4. Collision and Destruction Effects

The Cell Fracture add-on was utilized to simulate the shattering of pieces upon capture. Physics simulations ensured that fragments behaved naturally upon collision. Post-capture, original pieces were made invisible, leaving only the shattered fragments visible. For dramatic captures, flying fragments were animated using force fields for added dynamism.

5. Camera Motion

Various angles, including over-the-board shots and close-ups, were employed to highlight critical moments. Depth of field and smooth transitions were applied to maintain focus and viewer engagement.

6. Sound Design

Background music was chosen to match the tension and strategy of the game. Audio was

synchronized with the animation timeline to enhance immersion.

7. Rendering and Post-Processing

The animation was rendered frame-by-frame using Blender's Cycles ensure high-quality visuals.

Post-processing effects, such as motion blur, lighting adjustments, and color grading, were applied for a polished cinematic finish.

Chapter-5

OUTPUT AND RESULTS

5.1 OUTPUT

The final output of this project is a visually immersive and dynamic 5-minute animation that vividly brings a historic chess game to life. Using Blender, the animation effectively conveys the tension, strategy, and drama of the chessboard, showcasing key moments such as piece captures, the queen promotion, and stunning destruction effects. The chessboard and pieces were meticulously modeled, featuring detailed textures and realistic lighting. Each piece was distinct, with precise designs and textures enhanced through Blender's Shade Editor to add shine and glow, elevating the overall visual appeal.

The animation of the game unfolded with smooth and lifelike transitions. Key frame animation ensured precise movements, with the queen promotion standing out as a highlight—a pawn transforming into a queen accompanied by the dramatic emergence of a crown. Captures were brought to life through realistic collision and destruction effects using the Cell Fracture technique, with shattered fragments and flying debris adding dynamic intensity to the gameplay. Invisible transitions of captured pieces maintained seamless visuals, creating a polished and professional appearance.

Dynamic camera angles followed the game's progression, offering a cinematic experience through wide shots, close-ups, and over-the-board perspectives. Depth of field and lighting adjustments highlighted critical moves, drawing the viewer's attention to pivotal moments. The addition of synchronized sound effects, such as sliding pieces and shattering collisions, combined with atmospheric background music, further enriched the narrative, making it more engaging and immersive.

The animation not only brought this legendary chess game to life but also served as an educational and entertaining experience for audiences. By blending art, technology, and storytelling, the project showcased Blender's advanced capabilities while celebrating the timeless elegance of chess. The result is a compelling and visually stunning depiction of one of history's most iconic chess matches.

5.2 RESULTS

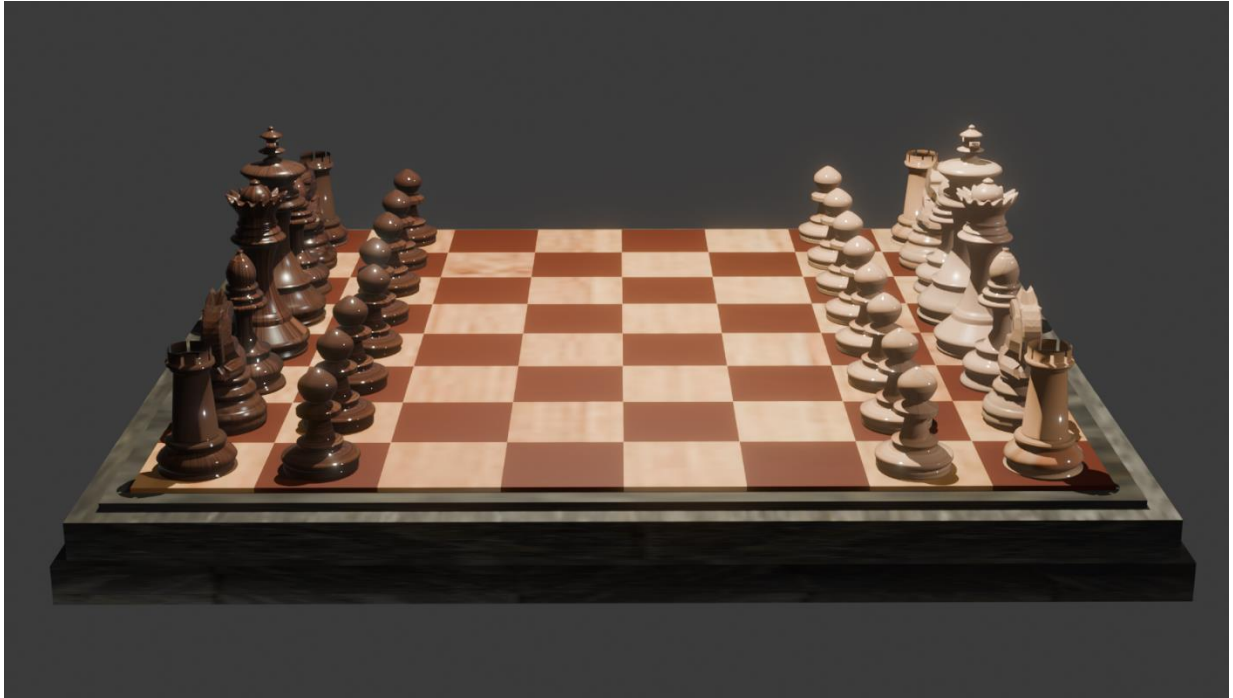


Fig 5.1 Introduction scene of the chessboard



Fig 5.2 A black pawn taking white pawn



Fig 5.3 A white pawn taking black bishop depicting cell fracture



Fig 5.4 A middle game image displaying some black pieces



Fig 5.5 View of entire chessboard during endgame

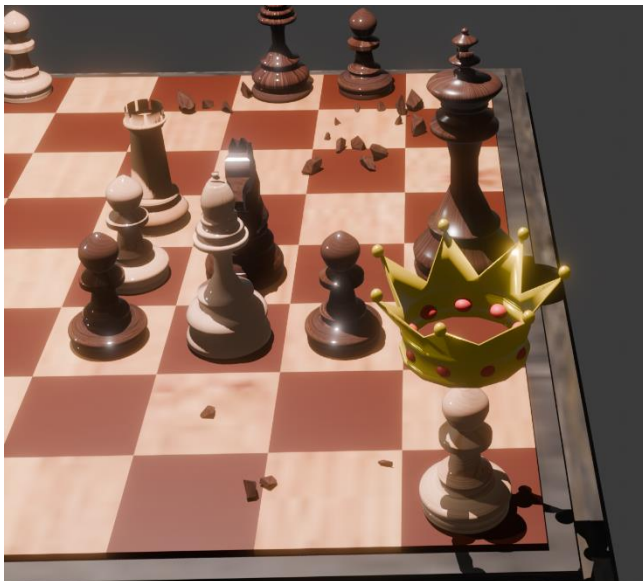


Fig 5.6 Pawn turning into queen



Fig 5.7 Pawn turned into queen

Chapter-6

APPLICATIONS

This chess animation project has a wide range of applications across various domains, showcasing its value beyond just a visual narrative. By leveraging Blender's advanced capabilities, the animation offers numerous practical uses:

- 1. Educational Tool:** The animation can serve as a powerful educational tool for chess enthusiasts and beginners, breaking down complex strategies and moves into a visually engaging format. By highlighting key moments such as piece captures, queen promotion, and strategic positioning, the animation makes it easier to understand advanced concepts and tactics. Chess clubs, schools, and online platforms can use the animation to teach the history of iconic games and provide visual guides to classic strategies.
- 2. Entertainment:** The dynamic presentation of the chess match offers entertainment for audiences, making the game more accessible and engaging even for those unfamiliar with chess. It could be showcased in museums, exhibitions, or digital platforms celebrating the history and art of chess.
- 3. Cinematic Production:** This project demonstrates the use of Blender in creating high-quality animations, making it a valuable asset for filmmakers and content creators. The techniques used in this animation could be applied to produce cinematic sequences in documentaries or promotional material for chess-related events.
- 4. Gaming and Virtual Reality:** The animation framework could be adapted for interactive chess games, allowing players to experience chess matches with dynamic visuals and immersive effects. Integrating the animation into virtual reality (VR) platforms would enable users to step into the chessboard, providing a hands-on and immersive experience.
- 5. Marketing and Promotions:** Chess organizations, tournaments, and platforms can use such animations in promotional campaigns to attract wider audiences. It can also be used as part of marketing materials for books, courses, or events related to chess.

Chapter-7

CONCLUSION

This Blender animation project successfully brought a historic chess game to life, blending the intellectual elegance of chess with the creative possibilities of 3D animation. By recreating the iconic match with precision and artistry, the project transformed a classic board game into an engaging visual narrative. Every element of the animation, from the meticulously modeled chessboard and pieces to the dynamic movements and effects, contributed to an immersive storytelling experience. The chessboard and pieces were crafted with realistic proportions and enhanced through detailed textures and shades, adding shine and glow to elevate their visual appeal. The animation followed the progression of the game, showcasing key moments such as strategic captures, dramatic sacrifices, and the crucial queen promotion. This pivotal transformation was depicted with flair, symbolizing triumph and strategy in an impactful manner. Physics-based effects, particularly the use of Blender's Cell Fracture tool, brought an added layer of realism to the animation. Captures were depicted through dramatic destruction effects, with pieces shattering or flying across the board, visually emphasizing the intensity of the game. Invisible transitions ensured seamless visuals, maintaining a polished appearance throughout the animation.

The narrative was further enhanced by dynamic camera angles, smooth transitions, and precise lighting. Wide-angle shots showcased the grandeur of the board, while close-ups highlighted critical moves. Synchronized sound effects, combined with an atmospheric musical score, heightened the emotional engagement of the animation, making each moment more compelling.

This project is a testament to the artistic and technical capabilities of Blender, showcasing its potential for creating immersive and visually stunning animations. By bringing this iconic chess match to life, the project not only celebrated the strategic brilliance of chess but also demonstrated how art and technology can combine to create compelling visual experiences for modern audiences.

REFERENCES

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