

special effects

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Film *Blade Runner 2049* 1 hour 14 minutes to 1 hour 16 minutes

1.Pre-Production Work

1.1 Idea/Story

The idea for this section of the film came from the original novel, *Do Bionic Men Dream of Electric Sheep?* and the setting of the previous film *Blade Runner*, as well as the ideas of director Denis Villeneuve and screenwriters Hampton Fancher and Michael Green.

The story of this segment of the film was designed to show the importance of Anna's character and her memories, as well as her relationship with Card, and to add to the suspense and conflict of the film, leaving the audience sympathetic and confused about the identity and fate of the replicants.

The story of this segment of the film also serves to echo the themes of the film, namely the relationship between memory and identity, as well as the differences and similarities between humans and replicants, and the moral and philosophical issues of artificial intelligence.



1.2 Split Screen

The split-screen for this section of the film was created by director Denis Villeneuve and director of photography Roger Deakins, who referenced the style and tone of the previous film, *Blade Runner*, whilst adding their own innovations and variations.

The split-screen of this film uses mainly close-ups and medium shots to highlight Anna's expressions and movements, as well as the details of her memory-making, while also creating an atmosphere of loneliness and isolation, reflecting her state of life and psychology.

1. close up, Anna's eyes, her pupils dilated, showing her concentration.
2. medium shot, Anna sitting on her knees on the floor, her hands holding a cylindrical instrument, the empty space in front of her, showing the memory scene she is creating, this section uses a lot of special effects, from scene building to character compositing.
3. medium shot, on-screen scene, an empty room with a platform appearing out of thin air in the middle of the empty space, on top of which there is a birthday cake with candles, the flames of the candles wavering.
4. close up, Anna's hand, she presses a button, the scene on the screen changes, a little girl appears on the edge of the platform, then other little girls follow.

5. close up, the little girl's face, smiling, full of happiness and anticipation.
 6. medium shot, scene on the screen, four more little girls appear, all wearing different coloured dresses.
 7. close up, Anna's hand, she adjusts a knob, the created scene turns, Anna modifies the details.
 8. medium shot, the scene on the screen, five little girls blowing out candles together, the flames of the candles go out and the surroundings brighten up.
- This subplot of the film also uses some special angles and shots from the viewpoint of Anna's eyes or the memory-making apparatus to add to the visual impact and impact of the film, as well as to suggest the authenticity and importance of her memories.

1.3 Animation/Pre-Visualisation

The animation and pre-visualisation of this section of the film was handled by the film's special effects team, who used advanced computer techniques and software, as well as live action footage, to create realistic and beautifully crafted memory scenes and effects. The animation and pre-visualisation of this section of the film is divided into two main parts, one is the process of making Anna's memories and the other is Anna's memories themselves.



The process of making Anna's memories is achieved through a technology similar to 3D printing, where she uses a cylindrical instrument with buttons and knobs to control the details of the memory's shape, colour, light, sound, smell, etc. The memories are then projected onto an empty space through an instrument similar to a projector, and this object is the memory's carrier, which can be implanted into the replicant's brain.

1.4 Design

The design of this section of the film was handled by the film's art team, who referred to the settings of the original novel and the previous film, while also adding their own creativity and style to design the memory scenes and effects that fit the setting and atmosphere of the film.

The design of this section of the film is divided into two main parts, one is Anna's laboratory and the other is Anna's memories.

Anna's laboratory is a space full of high technology and coldness, its tone is mainly white and grey, as well as some blue and green light, reflecting the nature of Anna's work and

environment, and at the same time contrasting with the outside world, highlighting Anna's loneliness and closeness.

2. Intermediate production work

2.1 Modelling

[1] The modelling of this section of the film was done by the special effects team of the film using professional 3D software, such as Maya, ZBrush, Blender, etc., to create 3D models of various objects and characters in the memory scene, such as candles, cakes, children, etc.

The modelling of this film is divided into two main parts, one is based on live action footage and the other is based on imaginary creation.

The modelling based on real footage is done by using photogrammetric techniques to capture real objects and people from multiple angles, and then analysed and reconstructed by software to generate corresponding 3D models, such as candles, cakes, etc. The modelling based on imaginary creation is done by using photogrammetric techniques to capture real objects and people from multiple angles.

Imaginative modelling is the use of sculpting and building techniques to design and create from scratch 3D models of memorable styles and content, such as children.

2.2 Textures, Mapping

The texture and mapping of this movie is done by the special effects team of the movie using professional 2D and 3D software, such as Photoshop, [2] SubstancePainter, Mari, etc., to add colours, textures, details, reflections, shadows, etc. to the 3D models of various objects and characters in the memory scenes to make them look more realistic and beautiful, such as the flame of the candle, the cream of the cake, the skin of the child, the clothes, etc. cream, children's skin, clothes and so on.

The texture, mapping of this film is mainly divided into two parts, one is based on real footage and the other is created based on imagination.

The texture mapping based on real footage is made by using photos or videos to extract the colour, texture and details of the surface of the objects and characters, and then editing and adjusting them by software to generate corresponding 2D or 3D textures, such as the flame of a candle, the cream of a cake, etc. The textures are created based on imagination. Imaginatively created textures and maps are designed and created from scratch using painting and doodling techniques to create 2D or 3D textures and maps that match the style and content of the memories, such as a child's skin or clothes.

2.3 Skeletal Binding / Skinning Setting

[3] The skeleton binding/skinning setup of this film was created by the special effects team of the film using professional 3D software, such as Maya, ZBrush, Blender, etc., to add bone and muscle structures and ranges of motion to the 3D models of the characters in the memory scenes, so as to enable them to carry out a variety of actions and expressions, such as the smile of a child, the action of blowing out candles, etc. The skeleton binding/skinning setup of this film is mainly divided into two parts, one is based on live-action footage, and the other is based on imagination.

The skeletal binding/skinning setup for this film is divided into two main parts, one based on live-action footage and the other based on imaginary creation.

The skeleton binding/skinning setup for the live action footage is based on the use of

motion capture technology to record the movements and expressions of the real actors, and then analyse and match them with the software to generate the corresponding skeletal and muscular data, which are then bound to the 3D model.

Skeletal binding/skinning for imaginative creation uses manual or automated techniques to design and create skeletal and muscular data from scratch that matches the style and content of the memory, and then binds this data to the 3D model.

2.4 Animation Production

The animation of this film is made by the special effects team of the film using professional 3D software, such as Maya, ZBrush, Blender, etc., to add dynamic and changing effects to the 3D models of the objects and characters in the memory scene, so that they are able to carry out all kinds of movements and interactions, such as the burning of candles, the blowing out of candles by children, and the micro-expressions of children.

3 Post-production work

3.1 Use of production tools/software

To achieve the visual effects of the film, the post-production team used a variety of professional software and tools, including:

[4] Nuke: a powerful compositing software that can process multiple layers of images and video, add a variety of effects and filters, adjust colours and lighting, and create realistic scenes and characters. The post-production team used Nuke to composite Anna's production memory scene, blending live-action footage with CGI footage to add details and atmosphere, such as candle flames and room lighting.

[5] Maya: a 3D animation software that can be used to model, animate, render and simulate a wide range of objects and characters, including replicas, flying machines, buildings and more. The post-production team used Maya to create the little girl in Anna's memory scene. They used motion capture technology to allow real actors to act out the movements and expressions of the little girl, and then imported this data into Maya to generate a high-quality 3D model, which was then tweaked and optimised in a number of ways to make the little girl look more natural.

Houdini: a procedural 3D software that can be used to generate complex dynamic effects such as explosions, smoke, flames, water currents, etc.

Mari: a professional texture painting software that can be used to add details and texture to 3D models, such as skin, clothes, metal, etc. The post-production team used Mari's advanced painting tools to draw various details and effects, such as skin wrinkles, to make these characters and objects look more realistic and textured.

[6] ZBrush: A digital sculpting software that can be used to create and modify high-resolution 3D models, such as the faces and bodies of characters. The post-production team used ZBrush to sculpt some of the characters in the film, such as Anna's face, eyes, etc., to make these characters look more unique and individual.

3.2 Compositing

[7] Compositing refers to layering different images or videos together to form a complete picture. Compositing is an important part of post-production and can achieve many impossible scenes and effects in film. For example, in the film, we see Anna through the hands of the equipment in the laboratory centre empty space to build a five little girls blowing out the candles of the scene, this scene is achieved through synthesis. The steps are as follows:

Firstly, the actors filming Anna performed in front of an empty green screen, using props in their hands to simulate the action of operating the equipment.

Then, Maya software was used to create a virtual laboratory environment, including floors, walls, lights, etc., as well as a virtual device to match Anna's props.

Next, Maya software was used to create a virtual cake and seven virtual little girls, along with their animations and expressions to make them look like real people.



Finally, use Nuke software to composite Anna's actors, the virtual lab, the virtual equipment, the virtual cake and the virtual little girls together, adjusting the position, angle, size, transparency, shadows, etc. to make them look natural and real.

3.3 Transcription

[8] The work of transcription is handled by Company3, a professional post-production company that has worked on many well-known film projects such as Avatar, Star Wars, Avengers and so on. The film *Blade Runner 2049* was shot on two main types of material: live action footage shot on 35mm film, and virtual footage shot on digital cameras, such as CGI or motion capture. Both types of footage need to be transferred so that post-production crews can work on the same platform. Film footage is transferred using the ARRISCANXT scanner, a high-end scanning device that converts film into high-definition digital files, preserving the detail and texture of the film.

3.4 Colour Correction

Colour correction was also handled by Company3, who used DaVinciResolve software, an industry-leading colour grading software that allows for fine colour control and adjustment of the picture. The colour style of the film *Blade Runner 2049* is a contrasting style of warm and cool, reflecting the theme and atmosphere of the film.

3.5 Final output

[10] The final output was handled by Deluxe, a leading global digital media services company that provides a one-stop solution from shooting to distribution. The final output of the film *Blade Runner 2049* needs to take into account the different versions and markets of the film, such as 2D, 3D, IMAX, DolbyVision, DolbyAtmos, etc., as well as different languages and territories, such as English, Chinese, and Japanese. The final output process requires appropriate cropping, scaling, rotating, aligning, etc. to fit different screens and sound, as well as adding necessary subtitles, watermarks, logos, etc. to meet different legal and commercial regulations. The final output results in a series of high-quality digital files that can showcase the charm and excitement of the film on different projection platform

3.6 Final Output.[9]

Reference

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- [2] Wenju, Liu. (2011). *Maya Material and Lighting Essentials*. Tsinghua University Press. P114-117.
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- [4] [為什麼好萊塢電影都用 Nuke 合成? 以及合成軟體的差異 - MoonShine Animation - Medium](#)
- [5] [【Maya】Maya 动作捕捉动画技术训练教程\(中英双字\) 哔哩哔哩 bilibili](#)
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- [8] [【百年百影 X 1919】转描技术如何彻底改变了动画_哔哩哔哩 bilibili](#)
- [9] [【摄影调色】如何快速调出《银翼杀手 2049》的赛博朋克色调?_哔哩哔哩 bilibili](#)
- [10] [杜比 Dolby Vision 和 Dolby Atmos 是什么? - 知乎 \(zhihu.com\)](#)

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GRADEMARK REPORT

FINAL GRADE

60/100

GENERAL COMMENTS

Your analysis encompasses various aspects, ranging from story development to animation production and post-production tools.

Technical Details: You've provided insightful technical information about the software tools utilized in modeling, texturing, animation, and compositing, enriching your analysis with depth.

Suggestions for Improvement:

Organization: Consider structuring your feedback into sections like "Pre-Production," "Intermediate Production," and "Post-Production" to enhance reader comprehension and navigation.

Clarity and Conciseness: While detailed information is crucial, ensure clarity and conciseness in your sentences. Some sentences are lengthy and could benefit from being broken down for improved readability.

Visual Aids: Incorporating visual aids such as images or diagrams could clarify certain concepts, particularly when explaining the split-screen or memory-making process.

Personal Insights: Adding your personal insights or opinions on the effectiveness of the techniques employed can enrich your analysis. Do you believe the split-screen or animation techniques contribute positively to the overall film experience?

Formatting: Maintain consistency in font and spacing to uphold a professional and organized appearance throughout the text.

Additional Points:

Grammar and Language: Proofread the content to ensure grammatical accuracy and effective language usage.

Conclusion: Consider including a succinct conclusion summarizing your overall perspective on how these production techniques contribute to the film's success.

These suggestions aim to enhance the clarity and impact of your feedback. Your detailed breakdown already provides valuable analysis.

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