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FROM OPPOSING SPACES TO FUZZY BOUNDARIES: EXPLORATION OF VISUAL IMAGES OF CYBERSPACE FROM THE PERSPECTIVE OF PRODUCTION DESIGN

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Abstract:

With the continuous expansion of art boundaries, Cyberspace has gradually shifted from philosophy and the computer field to visual design. More and more artists and designers are exploring different visual possibilities in Cyberspace. As the film has led the visual representation of Cyberspace in recent decades, the visual designer of film—production designers has become the main designer of the visual image of Cyberspace. During the decades of visual development of Cyberspace, this study selects three typical films in different eras for analysis, and it mainly explores the visual images of Cyberspace from the perspective of production design and considers that the development of visual images of Cyberspace has changed from opposing space to fuzzy boundaries.

Keywords:

Cyberspace; Production Design; Virtual Reality; Visual Image

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Introduction: Cyberspace and Production Design

"Cyberspace" is a combination of "Cybernetics" and "Space". It refers to virtual reality in computer networks and is one of the key concepts of cyberpunk culture [6]. In 1982, William Gibson first created the concept of Cyberspace in his novel Burning Chrome, which was published in the short story collection Fragments of a Hologram Rose: "LEDs on the matrix simulator glow red and green, The matrix unfolds in Automatic Arm Jack's consciousness, and Bobby, the cyber-cowboy, steals data and money in cyberspace", and these ideas foreshadow cyberpunk's bible Neuromancer (1984). In addition, several novels about Cyberspace have been adapted into movies, short films, TV series, and video games as the theme of offline art exhibitions and have become the conceptual inspiration for VR art and costume design. In the process of cultural communication, Cyberspace has gradually changed from a literary concept to a vision.

In the visual expression of Cyberspace, production designers become the main designers of the visual images of Cyberspace. Production design includes a wide range of visual elements that comprise the concepts of a film, television program, and theatre production. Tron (1982), The Matrix (1999), Ready Player One (2018), and other films that contain a lot of elements of Cyberspace have led the visual expression of Cyberspace in recent decades. As the visual designer of the film, the production designers have become the main designers of the visual images of Cyberspace. The production design is an art department specialized in the design and creation of visual film images, which mainly includes set design, character design and prop design, etc. This study mainly analyzes the visual design of Cyberspace in movies from the aspects of set design and vehicle design.

In terms of the design methods of Cyberspace, production designers have gradually shifted from emphasizing the opposition and difference between virtual space and real space to blurring the boundaries of the two. From the film Tron (1982), which designed virtual space completely opposite to material space through digital means, to the film The Matrix (1999), which designed virtual space that interlaced with real space, and then to the film Ready Player One (2018), which designs virtual spaces that are visually more realistic than real ones. The development of Cyberspace visual images in production design has changed from opposing space to fuzzy boundaries.

The Quest for Digitization： Visual Design of Cyberspace in *TRON* (1982)

In the same year that William Gibson coined the concept of cyberpunk in his novel Burning Chrome (1982), the film in which Tron first visualized Cyberspace. Cyberpunk can be defined as a specific genre of science fiction that is set in a lawless subculture of an oppressed society that is dominated by computerized technology [7]. The movie tells the story of Kevin, a programmer, who is sucked into Cyberspace by the out-of-control MCP and destroys MCP with the surveillance program he designed, TRON, and returns to the real world. The description of the virtual world occupies the main part of the movie. The story of TRON may seem familiar to today's audience, but the visual effects and design concepts were so innovative that the plot seemed irrelevant.

In the film TRON, the concept of Cyberspace was first presented on the screen as a visual spectacle through CG (computer graphics) processing and other special visual effects. It was one of the first films in the world to be designed and produced using computer graphics, and the NCGA (National Computer Graphics Association) considers it a milestone and watershed

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in computer graphics, ushering in the era of CG films [8]. In terms of animation effects, designers try to represent characters with light instead of traditional methods (ink & paint) and use computer-generated three-dimensional objects to represent the real perspective of space. As it was the first time to try digital special effects, more than 500 people participated in the visual effects design of the film, and they were mainly responsible for the hand-drawn part of the special effects design. A team of eight people on the CG side had only one computer available, and a 300MB disk module was the size of a dishwasher.

In addition to the digitalization of technology, the digitalization of art is more important for designers. How to present the digital virtual world--Cyberspace through visual images is what the production designers at that time have to think about. Production designers innovate in design concepts: they try to create a virtual world that is the exact opposite of the physical world. In the set design of TRON 's Cyberspace (Figure 2.1), production designers visually use “neon-outlined, abstracted geometric forms and the grid layout as a representation of internal computer processes” [5]. In this visual grid structure, characters wearing electronic circuit clothes move linearly and angularly along the grid nodes. The architecture is presented by vector graphics, and there is no material or texture distinction between objects. Colour has become a way to evaluate objects in Cyberspace: TRON 's heroes are blue neon, and its villains are red neon.

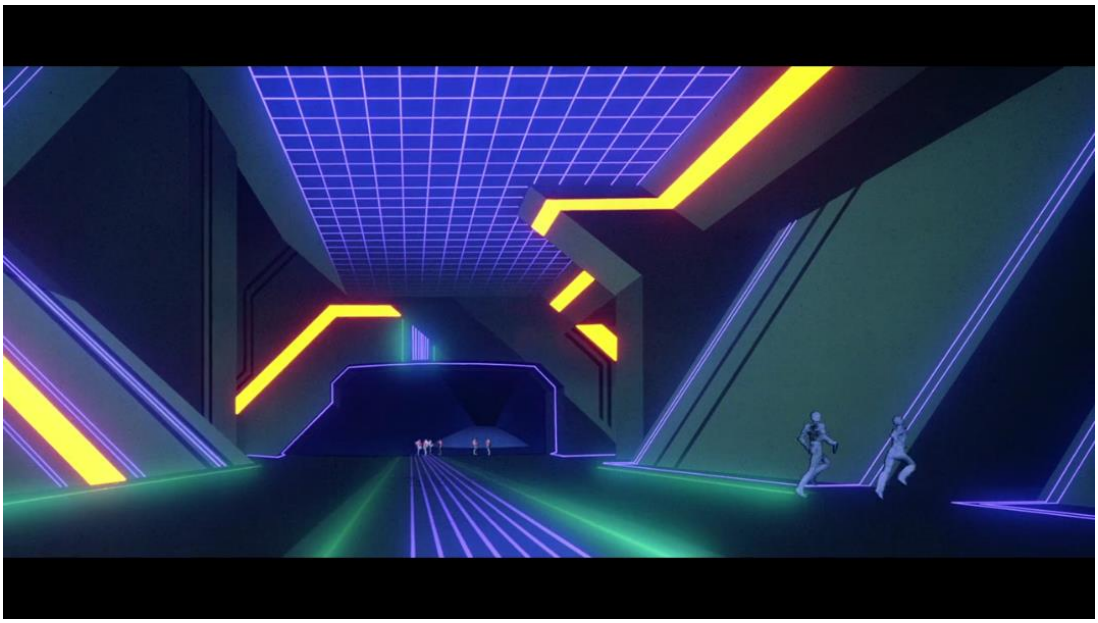

Figure 2.1 The Set Design of Cyberspace in *TRON*

In the early 1980s, when the Internet and personal computers were not widespread, the visual design of TRON 's Cyberspace was largely derived from the video game interface. The scene of the battle of characters in Cyberspace is designed in two ways: One is designed as a motorcycle competition, in which motorcycles gallop in a three-dimensional grid game field. The linear exhaust wall of motorcycles can form a maze circle to kill each other, visually similar to the videogame "Blockade"(1976) （Figure 2.2）. The other is designed to hit the particles of light with a flying saucer in hand. This design comes from the early game of "Pong"(1972) （Figure 2.3）, which is a video game that simulates two people playing table tennis. In fact, it is really just a point moving between two lines. And the visual design for

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flying saucers came from early computer discs. These games were developed by ATARI, the giant gaming company of the time, and even the shape of the laser radiation on the classic film poster bears some resemblance to the shape of the logo of ATARI.

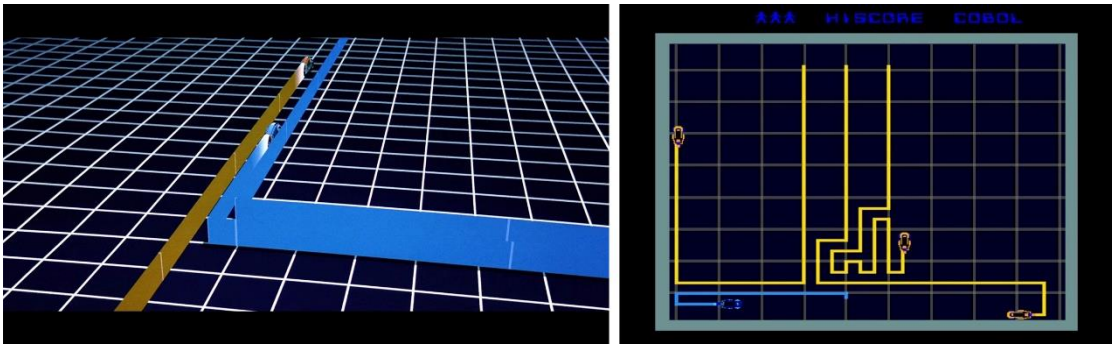

Figure 2.2 Left is A Motorcycle Competition in Cyberspace, and Right is The Game Blockade.

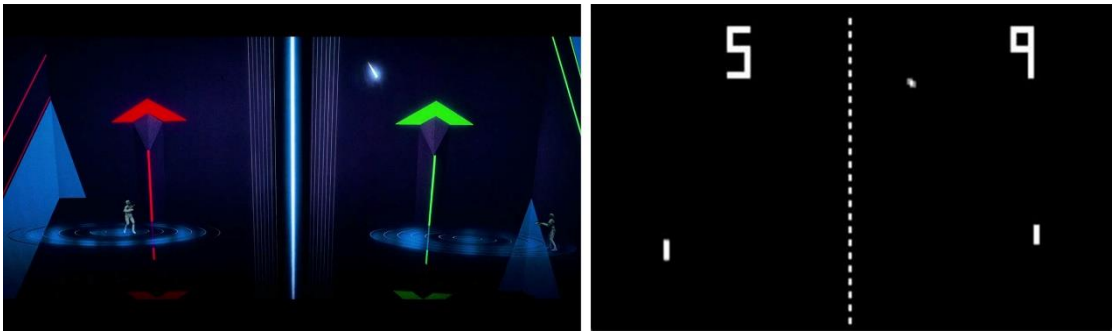

Figure 2.3 Left is a Flying Saucers Competition in Cyberspace, and Right is The Game, Pong.

In terms of vehicle design, the “sentry” in Cyberspace is designed to act as a flight scout, like a gate, which can block traffic by moving doorposts. The “guards” in Cyberspace are designed in the shape of tanks, clumsy tanks, and speeding motorcycles in visual contrast to the chase. The transmission vehicle in Cyberspace is designed as a satellite dish in the shape of a butterfly wing and moves in a linear fashion with light, making it visually light. Syd Mead, the concept designer for TRON, once commented, "The mandate was to design something that no one had ever seen”. In the design of TRON, he was responsible for the vehicle design and set design, creating the amazing “Photoelectric Motorcycle. (Figure 2.4)

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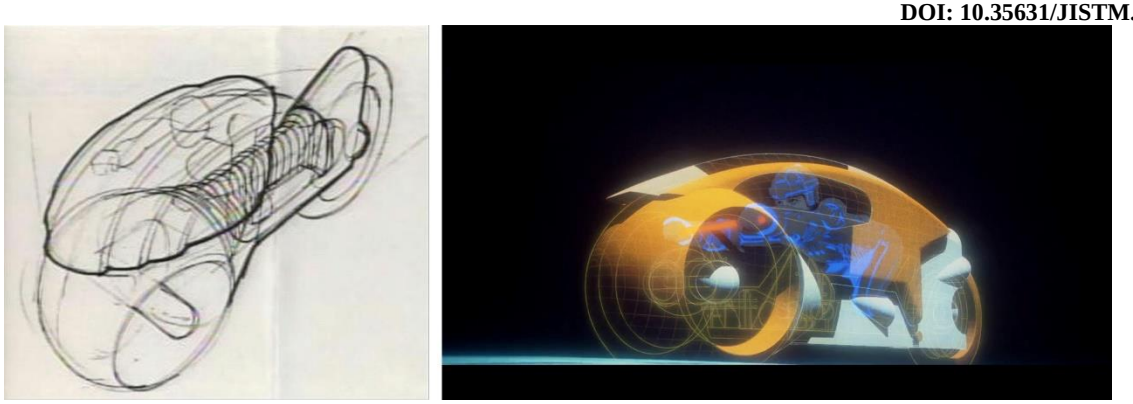

Figure 2.4 Left is The Concept Design of The Motorcycle by Syd Mead, and The Right is The Final Frame of the Motorcycle.

The designers for TRON opened the door to visualizing Cyberspace. In the early 1980s, before personal computers and digital devices became commonplace, production designers visually designed Cyberspace as a digital virtual world similar to a computer process. This was in line with the fantasies of the designers of the time about the future of technology and ushered in a new fashion of electronic aesthetics. We can also regard this kind of electronic aesthetics as technical aesthetics, which includes the worship of technical products, especially electronic products, and digital devices, and then produces a feeling of infatuation with the design style of electronic products. The electronic aesthetic in TRON 's cyberspace design comes from the graphics in video games, the cool glow-in-the-dark effects, the simple graphical interface, and so on. These stylized designs were the initial exploration of digitalization by production designers at that time and gradually influenced the fields of costume design, industrial design, and graphic design.

The Interlacing Of The Real And The Virtual: Visual Design Of Cyberspace In *The Matrix* (1999)

Cyberspace has resulted from the collective ability of humans to articulate the possibilities wherein the technical artefacts are conceptualized, used, and designed. The original concept design for The Matrix (1999) dates back to William Gibson's cyberpunk novel Neuromancer (1984), in which the main character is a hacker who steals information by directly invading the matrix or Cyberspace. The Matrix tells the story of a young network hacker, Neo found that the seemingly normal real world is actually controlled by a computer artificial intelligence system named "matrix", Neo met the leader of the hacker organization Morpheus under the guidance of a mysterious girl Trinity, the three embarked on the struggle matrix story. Unlike TRON, which has a sharp visual boundary between Cyberspace and the real world, Cyberspace and real space in The Matrix are interlaced and blurred. In the movie The Matrix, the real space is designed to be the future world 100 years later, while Cyberspace is transformed and designed based on current real life. It is difficult for the audience to visually see whether it is Cyberspace or real space.

Instead of designing a digital virtual world that "no one had ever seen" like Tron, the designers used green as the main colour of Cyberspace on the basis of the material world in the set design for The Matrix. This is mainly derived from the visual symbol of digital code. The designer adopted green as the visual keynote of cyberspace and data flow as the visual symbol of Cyberspace. Everything in the virtual world is a shade of green, partly because early computer interfaces were filled with green letters on a black background, the symbol of computer code.

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On the other hand, green represents mystery, and large areas of green are used to make the virtual world seem unreal and unnatural, which should not be too obvious. Colour can trigger a lot of emotions, with green not only making skin look pale and lifeless but also evoking ‘digital rain'. Colour tends to affect the emotions and behaviours of people. Particularly in virtual reality, green is found to have the most positive impacts on the lateral thinking and logical abilities of people, as well as their keen attention to detail in VR and also in the real world. It was as if a rain of green numbers had soaked every object in Cyberspace. (Figure 3.1)

Figure 3.1 Left is Digital Rain, and The Right is A Final Frame of Cyberspace.

Different from the design of Cyberspace for TRON, in which the material and texture of the objects are removed, and only the geometric lines are retained, Cyberspace The Matrix is designed to be more orderly and realistic than real space. The production designers for The Matrix emphasized material information in their design: the main props were designed as cold metal instruments, highlighting the mechanized creation of the world by a "computer matrix". With hard lines and cold colours everywhere, the virtual city seems like a giant machine operating without emotion.

The real world of The Matrix is set 100 years into the future. In the design of the future world, the production designers did not pursue the aesthetic of cool electronic technology but cold grey as the dominant hue. The design focuses on the combination of machinery and natural creatures and uses future machines to simulate giant octopuses, squid, spiders, and other creatures. It makes people feel that although machines have almost killed off life on the earth in the future, the appearance of the robot world still comes from the world of human beings."There's an irony in the visual aesthetic: machines are trying to imitate the very thing they're trying to destroy," says designer Warren Manser. Cartoonist Geoff Darrow, who created the “sentinel” image (Figure 3.2) of a mechanical squid for the film, sees a future in which machines mimic living things and designs future machines to look like a cross between a deep-sea creature and an insect.

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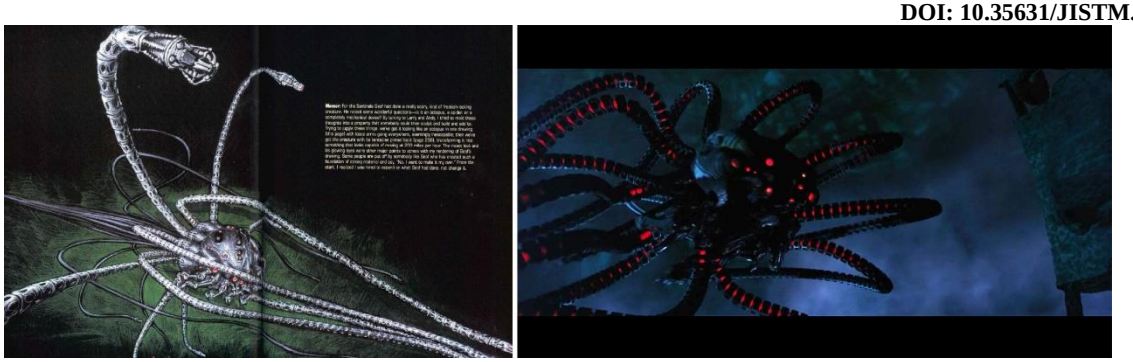

Figure 3.2 Left is The Concept Design of The Sentinel, and The Right is the Final Frame of The Sentinel.

In the vehicle design for The Matrix, concept artist Geof Darrow created concepts for a human battery farm and biomechanical medical devices and worked with production designer Tani Kunitake to design the Spaceship Nebuchadnezzar -- sort of a cross between an underwater creature and a submarine. The interior of the ship is not designed to pursue futuristic electronic technology, but a dystopian, anti-technology style based on the thick steam style. There are plenty of glowing engines on the outside of the ship, which Designer Tani explains: "we tried to figure out ways to put engines about the ship where they wouldn't normally be, and it had to look defensive". The engines were designed in all directions so that the ship could fly in any direction, a flexibility that became especially important when evading sentinels. “Glowing engines on all sides help them see the outline, the perimeter of the Nebuchadnezzar in the dark, with it always shuttling around and hiding or bolting down very dark tunnels. So we gave it all these spiny projections, giving it a kind of deep-sea angler-fish feel.”(Tani Kunitake, p250)(Figure 3.3)

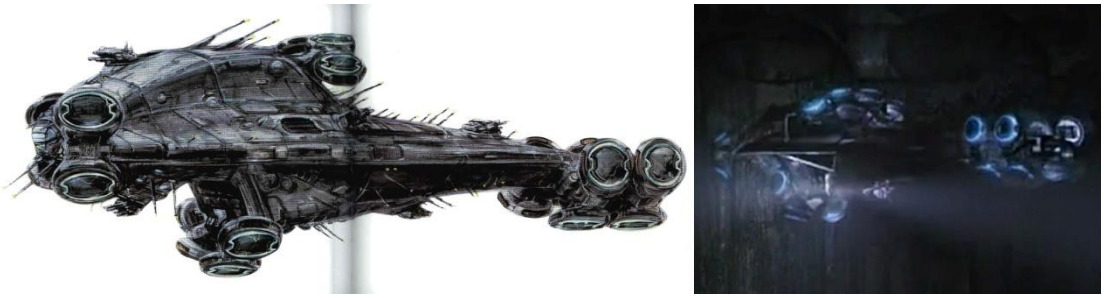

Figure 3.3 Left is the Concept Design of Spaceship Nebuchadnezzar. Right is The Final Frame of Nebuchadnezzar

In short, in the visual design of Cyberspace in The Matrix, the boundary between the virtual world and the real world begins to break down, at least visually. At this time, although the design of Cyberspace began to mix with the real world, it still emphasized a kind of visual integrity. The props in Cyberspace were relatively unified in visual style, and the set design also lacked changes.

Real Virtual World: Visual Design of Cyberspace in *Ready Player One* (2018)

Unlike TRON and the Matrix, which emphasize the "integrity" of cyberspace visual style, Ready Player One (2018) emphasizes the "individuality" of users in Cyberspace in terms of production design----a lot of different styles and periods of pop culture are mixed in. Ready

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Player One tells the story of a boy who is addicted to the game in real life. Based on the in-depth analysis of the virtual game designer, he finds the three keys hidden in the card in the virtual world and successfully completes the game. With the rapid development of the Internet, ordinary audiences are not unfamiliar with understanding the Internet world. Therefore, the Cyberspace of the film is presented in a more "everyday" way visually. Compared to the cold, bleak and lifeless world of the future, Ready Player One's Cyberspace -- the Oasis -- is visually colourful, all-encompassing, vibrant, and even more real than real space.

In the set design for Ready Player One, the cyberspace “OASIS" is designed to create a visual spectacle of cultural mixture: parks, museums, dance halls, and cinemas, as well as animation, film, and video games. Designers use high saturation and warm colours to design a vibrant, bizarre, and wonderful visual world (Figure 4.1). Adam Stockhausen, the production designer for Ready Player One, said of cyberspace design: “we want to make the OASIS more than the real and available world in just about every way you could imagine, more fun, more saturated…just more. So, there are very different spaces that we go to that seemingly have no relationship to one another, but they are all the different facets of this escape from real life.” (Adam Stockhausen, p54)

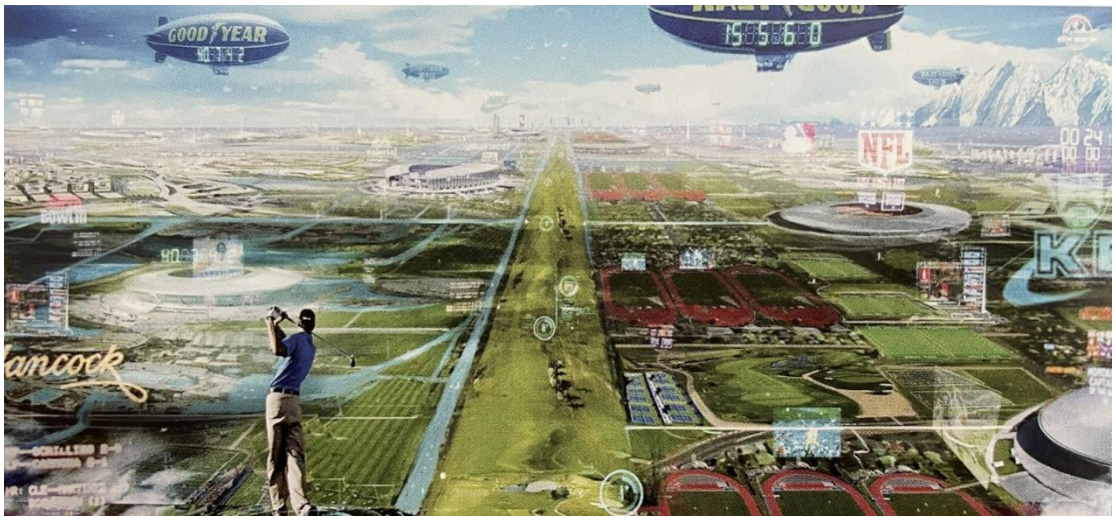

Figure 4.1 The Concept Design of Cyberspace “OASIS”

Rich visual images can sometimes distract the viewer's attention, so the designers use a lot of "sails" in the set design of Cyberspace for Ready Player One (Figure 4.2). The designer Jaeger says: “together with Adam, we came up with this idea of this world that's made of sails. It also made for a nice lighting environment—you have this diffuse light coming through all their levels of sails, which made for a nice clean background to put all these portals and wild characters walking around. You concentrate on the foreground and won't be distracted by some busy background with a million things flying around. You're forced to focus and look down at the Ninja Turtles walking next to Hello Kitty,” (p54)

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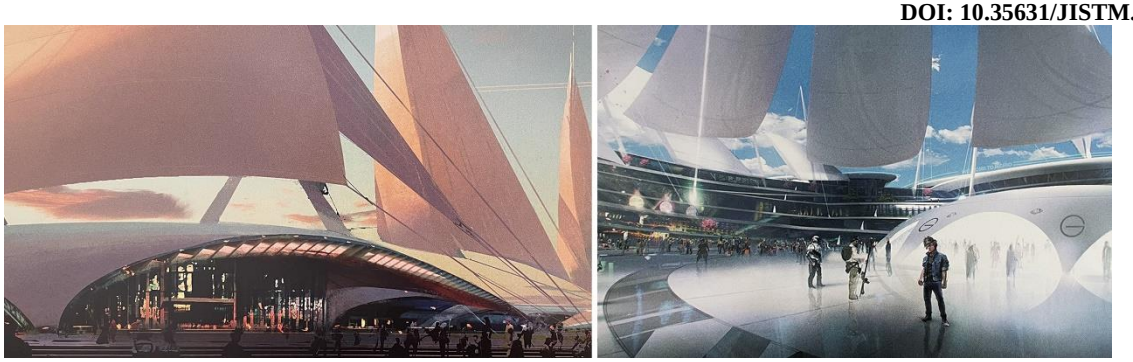

Figure 4.2"Sails" in the Concept Design

In the vehicle design for Ready Player One's Cyberspace, production designers do not blindly pursue the virtual sense of technology, nor do they design vehicles that do not exist in real life, as in TRON and The Matrix. Instead, they choose to transform the functions and appearance of real cars. The prototype car hero drove in Ready Player One was the DeLorean DMC-12, which was discontinued after only about 9,200 were produced between 1981 and 1982, making it a relatively unpopular car. But the car is best known for its role in the sci-fi film Back to the Future (1985). The DMC-12 was modified in Back to the Future to be a time-travelling machine, and whenever the car reaches speeds above 88 MPH, huge electric currents are sent into its flux capacitors, travelling through time with its passengers in a shower of sparks. In Ready Player One, the concept designer gave the DMC-12 a makeover: bullet-riddled body, crumbled bumpers, left headlights kept going out, and a revamped centre console for the interior (Figure 4.2). Designer Jager explained it this way: "It's a Back to the Future DeLorean, but it's been beaten up, and he doesn't have the money to fix it up, so this is what happened."(p70)

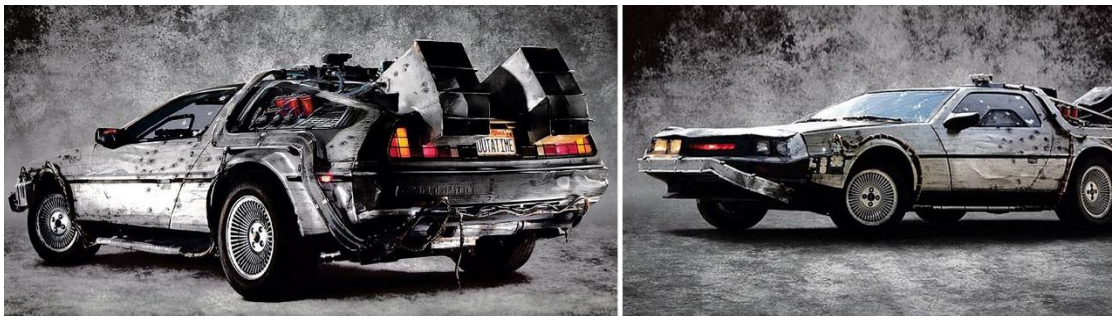

Figure 4.3 The Concept Design of DMC-12

In short, the production designers for Ready Player One try to be more real than the real world in the visual design of Cyberspace, and the sense of the reality of this virtual space comes from the escape of individuals from the real world. The designers chose to mix different pop culture and various visual elements into the design to enhance this sense of reality while also trying to arouse the aesthetic resonance of a wider view.

Conclusions

As one of the core concepts of cyberpunk, with the development of digital technology and the popularization of information networks, the visualization of Cyberspace presents a development trend from opposing spaces to fuzzy boundaries. The designs for TRON made a

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preliminary exploration of the visual digitization of Cyberspace in the early 1980s.In the late 1990s, the designers for The Matrix began to design Cyberspace that interlaced reality and virtuality. In recent years, visually blurring the boundary between Cyberspace and physical space has gradually become a cyberpunk theme, and Ready Player One is one of them. Visual images such as grids and geometric shapes in the virtual world are no longer obvious. Elements of futuristic technologies, such as neon-outlined and reflective materials, also permeate the physical world. How to remind the viewer of the transformation of time, space, and scene through visual differences is the main problem for production designers to think about.

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