

Animation Display Design of Intelligent Factory of China Ruili Group

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Abstract

Ruili group intelligent factory animation focuses on MES system, AGV system, parts manipulator processing, cleaning, testing, marking, manual sampling, parts QR code management. The animation can better restore the intelligent factory work engineering, and make a better demonstration effect for the enterprise's intelligent factory. Now animation is a technology of computer, culture, design and other interdisciplinary. In the design for the company to consider many aspects, three-dimensional modeling, drawing, rendering and other steps, in order to complete a better effect for the company.

Keywords

Animation; Design; Intelligence; Administration.

1. Project Background

The project of "intelligent factory animation of China Ruili group" is a typical case of the University and China Unicom Industrial Internet Research Institute using "Internet" technology to assist the Internet transformation of industrial manufacturing enterprises. Under the leadership of China Unicom, the digital media professional team of our department is responsible for 3D animation production. The project mainly shows the parts production and assembly process of the intelligent factory workshop of China Ruili group, which has been recognized and praised by the enterprise.

2. Analysis and Production

Unicom is mainly responsible for the preliminary enterprise research to understand the needs of enterprises and the demand of making intelligent factory animation of China Ruili group. After confirming the demand with the other party's enterprise, our digital media team, through field investigation, understands the specific demand of the enterprise, and finally determines the cooperation intention.

3DMAX, Vray, premiere CC and after effects are mainly used in animation engineering. 3DMAX is mainly used for 3D scene modeling, as shown in Figure 1, animation production, scene building, lighting arrangement and material addition; Vray is responsible for rendering and exporting animation; A single animation segment is synthesized, toned and subtitled in premiere CC software; The animation head is synthesized in the post effects software.

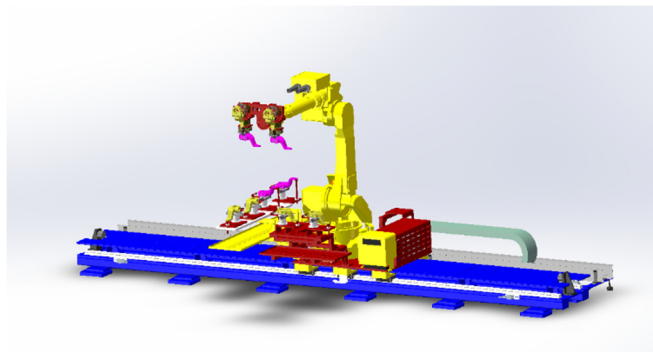


Figure 1. Assembly manipulator

The team members are shown in Table 1

Table 1. Division of members

	3D modeling	Scene construction	3D animation	Video synthesis
Guangke Qi		✓	✓	✓
Shengbo Wu	✓	✓	✓	
Jing Li	✓		✓	

Qiguangke: 3D animation, scene building, video synthesis;

Wu Shengbo: 3D modeling, 3D animation, scene building;

Li Jing: 3D modeling, 3D animation.

3. Rendering

The project mainly shows the parts production and assembly process of the intelligent factory workshop of China Ruili group. Animation focuses on the intelligent factory MES system, as shown in Figure 2, AGV system, parts manipulator processing, cleaning, testing, marking, manual sampling, parts QR code management.



Figure 2. Impact of MES on production capacity

Based on Windows 10 Chinese operating system and SolidWorks combined with object-oriented technology, the design and development of Xinchen faucet is developed, which is convenient for the public and meets the needs of daily life. Taking the existing products as an example, this paper analyzes the structural design of the new and old faucets, discusses the design methods and rules of the new and old faucets, and in the process of structural design, combines SolidWorks 3D model software as shown in Fig. 3 and 4 to improve them, such as through the core, generating drawings, processing and manufacturing, trying to avoid multiple mold changes, mostly trying to improve the assembly success rate in the design and development process. The rationality of the design is tested.

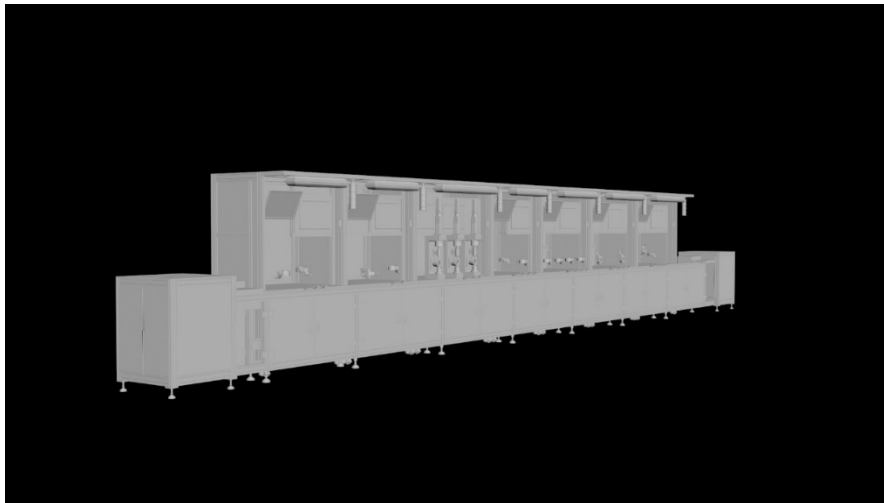


Figure 3. Pipeline white mold



Figure 4. Pipeline color diagram

The main content from these aspects, access to literature, understand the working principle of machining, the nature and type of workplace and the different changes of structure. Analysis of its inherent data parameters and structural dimensions, as well as the working principle of machining and the basic operation process method, lay a good theoretical foundation for the follow-up design. At the same time, SolidWorks 3D software is used to complete the four views of the parts, as shown in Figure 5, to complete the three-dimensional production of the structural parts in machining, and the overall equipment model. With these functions, the rapid design system is completed, and the complete rapid design of machining is developed.

At present, Solidworks, MDT, UG, Pro-E, SolidEdge and rhino are popular 3D CAD software in China's CAD market. But in terms of price, Solidworks, MDT and SolidEdge are products with medium and low price, while UG, Pro-E and ideas are products with medium and high price. SolidWorks is a set of desktop integrated system of CAD, CAE, cam and PDM based on windows.

It is the first mechanical 3D CAD software realized by Solidworks in Windows environment on the basis of summarizing and integrating large-scale mechanical CAD software. It was successfully developed in November 1995. It adopts the feature modeling technology of non full constraints, and its design process is fully relevant. It can modify the design according to the actual situation at any stage of the design process, and it can also affect the modification of relevant parts.

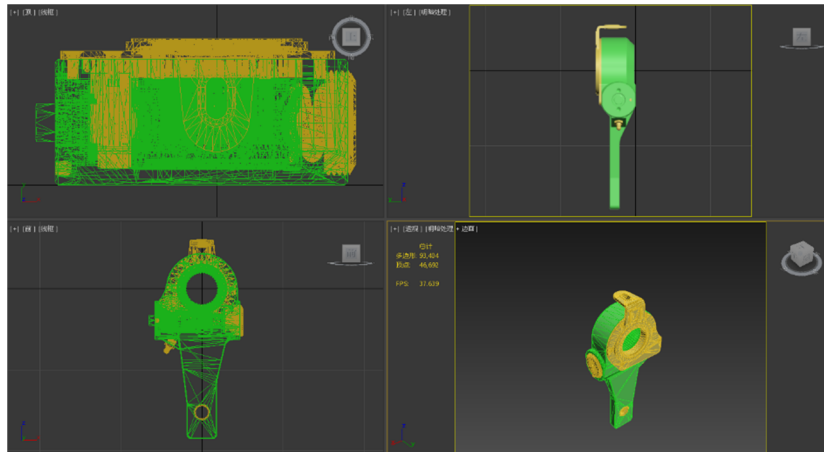


Figure 5. Four views of parts

SolidWorks has a huge user group in the world, more than 200000. In foreign countries, most companies require them to have the ability to skillfully operate SolidWorks when recruiting personnel. At the same time, many first-class universities have positioned SolidWorks as a compulsory course for students, such as Massachusetts Institute of technology, Cambridge University and so on. SolidWorks is widely used in western enterprises, and has been rated as excellent software by some American magazines for several years.

4. The Best Operation Direction of Rotating Arm

The effect picture of rotating arm is shown in Figure 6.

Lateral 60 °, When one hand moves, it is the easiest and fastest direction of motion.

Bilateral 30 °, When the hands move, the most relaxed and fastest movement direction.

Bilateral 0 ° Hands accurate, easy, fast operation of the best direction.

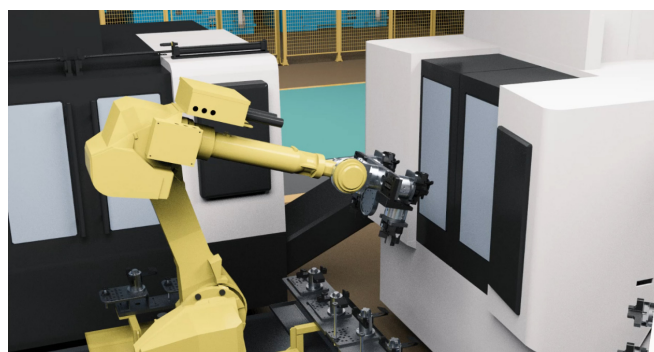


Figure 6. Manipulator action

Table 2. Manipulator parameters of different parts

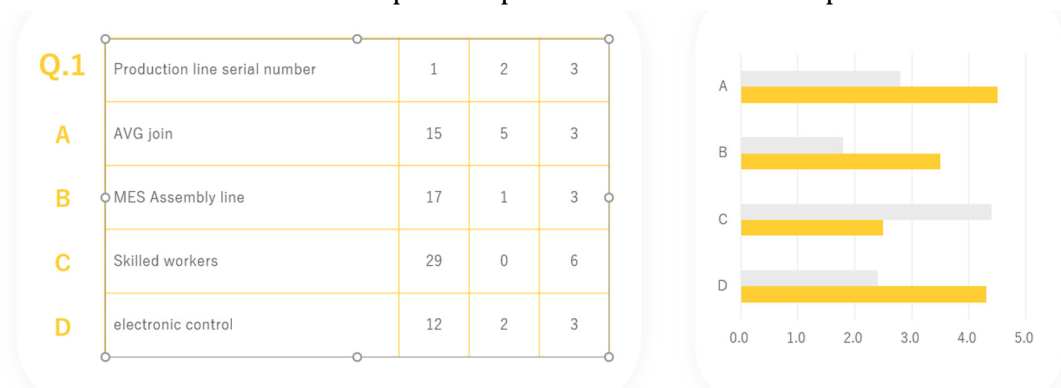
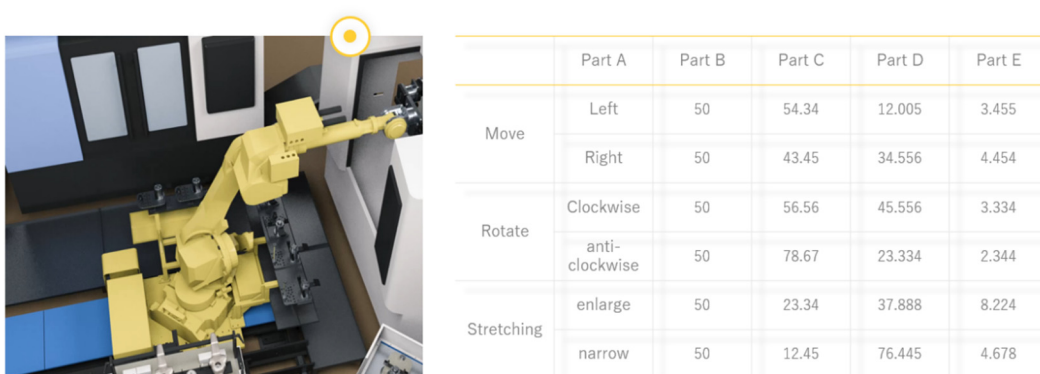


Table 3. Parameter definition of telescopic part of manipulator



5. Standing Posture and Arm Bending Operation

From the relationship between the manipulation force of the hand hook to the shoulder and the angle between the forearm and the upper arm, it can be seen from figure 8 that the angle between the forearm and the upper arm is about 70. It has the maximum control force. Therefore, the height of the manipulator is designed to be 900mm, which is more labor-saving, as shown in Figure 7.



Figure 7. Turning of parts

In order to make the assembled products more beautiful and fashionable, we should first start from the materials, break through the existing stainless steel materials, and use some hard plastic materials, such as ABS, with light weight, insulation, good luster and unique plasticity. This kind of handcart is not only light, but also beautiful. The assembly drawing of parts is shown in Figure 8.

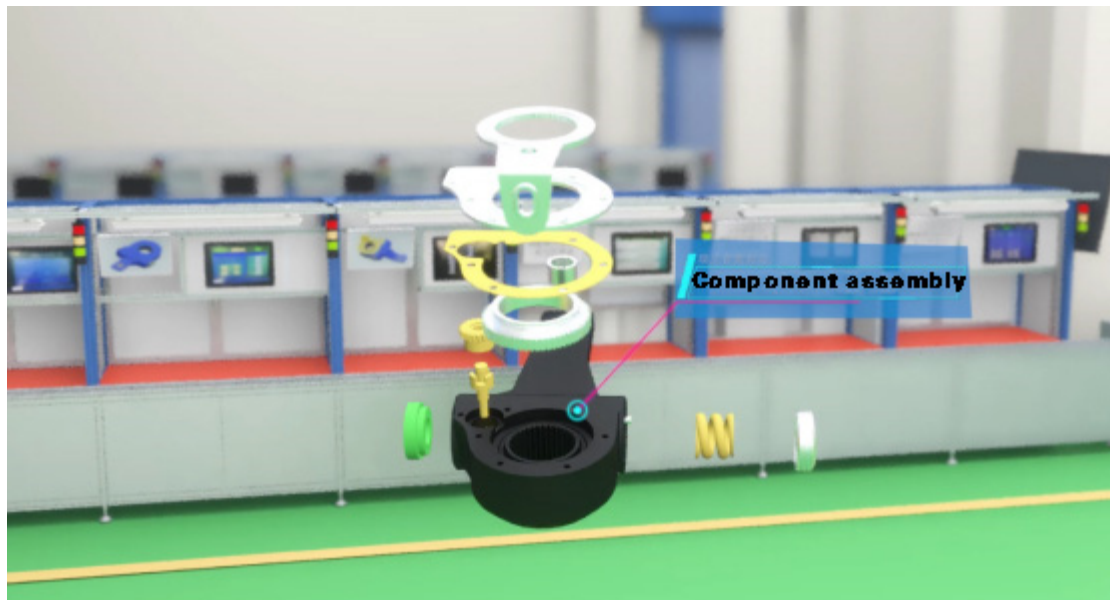


Figure 8. Assembly drawing of parts

6. Type of ACV Trolley

ACV vehicles are divided into single wheel, two-wheel, three wheel and four wheels. ACV car as shown in Figure 9, unicycle can run on narrow springboard, bridge and catwalk, can turn in place, dumping goods is very convenient. The commonly used two wheeled vehicles are ACV vehicle, push vehicle (also known as tiger car), shelf vehicle and bucket car for bulk materials. There is one in the three wheeled cart and two castors in the four wheeled cart that can rotate around the vertical axis. This kind of slewing wheel can be automatically adjusted to the direction of minimum running resistance with the change of vehicle movement direction. The flow chart of AVG car is shown in Figure 10.



Figure 9. AGV trolley

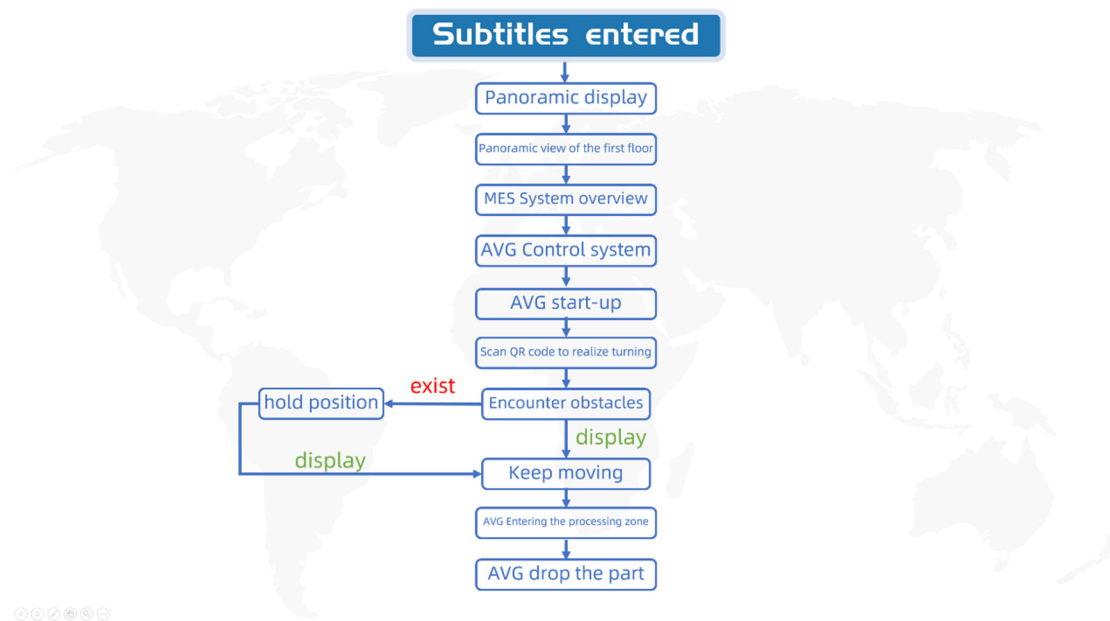


Figure 10. Flow chart of AVG trolley

7. Conclusion

In the animation design, people in the emotional communication with the product, in order to enhance their desire for the product, we must pay attention to the practicality and functionality while innovating the shape, and at the same time, we should add the function of life interest. This design from the perspective of color, structure, material and other elements, reflects the humanization, easy-to-use, integration and modular function.

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