Research on Digital Twin of Practical Network Training of Clothing Design Specialty Based on Virtual Fitting Room Software

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Abstract:Through the statistics of digital twin related documents in the WebofScience core collection database, the bibliometric research method is adopted, and the observation points are the number of published papers and the distribution of documents, the cooperation between authors and research institutions, document citations, and the co-occurrence of keywords. This paper also designs a non-parametric anthropometric graph convolutional neural network that does not depend on any parametric body model, only needs to input a body mask image and a small number of anthropometric dimensions to explicitly predict the 3D body vertex coordinates. More than 95% of consumers have a strong desire to try 3D virtual fittings, 80% of consumers support the establishment of virtual fitting rooms in physical stores, and more than 60% of the respondents expressed their willingness to upload their own photos or human body data to construct the efficient model.

Keywords: Digital Twin, Practical Network Training, Clothing Design Specialty, Virtual Fitting Room

1. INTRODUCTION

Digital Twin is a virtual model that expresses the physical entity of a product in bits. It simulates the behavior of the physical entity in the objective environment and empowers the physical entity by means of virtual-real interactive feedback [1], data fusion analysis, and decision iterative optimization. Cultivating and improving the employability of college students and improving the quality of employment is one of the important goals and urgent tasks of current higher education [2].

Based on the opening of practical courses of clothing major in our college, this paper discusses the training mode and method to improve the practical innovation ability of students majoring in fashion design and enhance their employment competitiveness [3]. The most widely used and mature technology in the garment CAD system is the grading and layout system. Under the mode of mass production of garments, garment CAD has brought great benefits to garment enterprises in grading and layout. Since 2009, due to the continuous increase in the scale of online shopping, the number of consumers who use online shopping has grown rapidly [4], and the number of consumers who go to brick-and-mortar stores has been relatively stable. The growth rate of online shopping consumption in the first half of 2011 increased by 6% month-on-month.

Online shopping brings convenience to consumers. At present, there are two main types of 3D virtual fitting applications. The first type is aimed at ordinary consumer groups. [5] As we all know, when people buy clothes, they must first carefully select the styles they like, then find the size that is more suitable for their body, and finally go through the traditional process of trying on clothes. The whole process is not only very time-consuming, but also needs to go through a lot of processes. Once the clothes are not suitable, analyze the relevant knowledge elements and skill elements [6].

Emphasizes the applicability and necessity of course content, avoids the overlapping and repetition of knowledge through synthesis, highlights the cultivation of comprehensive knowledge and comprehensive practical ability [7], and forms a new course type based on integration. Today, film is not limited to using Animated special effects create large-scale, difficult-to-shoot complex scenes. 3D human and clothing modeling coupled with motion capture technology has played an important role in film animation, constantly providing a visual feast for moviegoers [8]. With the rapid development of 3D modeling technology and graphic image technology, virtual fitting technology has developed under the circumstance that consumers would rather give up buying clothes than try them on [9].

Virtual fitting is that consumers input the parameters of each part of their body, put digitally processed clothing on "self", and show the fitting effect. The research on digital twins is heating up rapidly, mainly focusing on the concept definition of digital twins [10], importance analysis, construction process description and value target expression, as well as applying the digital twin concept to specific intelligent manufacturing scenarios to solve specific practical problems. Employability refers to the ability of college graduates to achieve employment ideals, meet social needs and realize their own value in social life through knowledge learning and comprehensive quality development during school [11].

At present, the contradiction between students, schools and employers is prominent. The reason is that the knowledge structure and ability of clothing majors trained by traditional higher education cannot meet the requirements of new enterprises [12]. As one of the important modules of clothing CAD However, the traditional clothing pattern design system cannot play its due potential in clothing enterprises. For example, the looseness of clothing and the control of body shape still require the accumulation of long-term knowledge and experience of users [13].

The traditional retail industry uses e-commerce platforms to seize the opportunity and develop its own new marketing channels. In addition, online shopping consumers are obviously inclined to moderate and severe. In the second half of 2010, the proportion of moderate online shoppers has

exceeded half [14]. Take Taobao as an example. 3D virtual fitting is a new user experience technology based on Augmented Reality. It mainly uses computer recognition technology, graphics and related software to allow consumers to perceive the real clothing fitting effect in advance [15].

2. THE PROPOSED METHODOLOGY

2.1 The Virtual Fitting Room Software

According to the training goals of fashion design professionals, the practice is divided into five modules: basic cognition, process production, product design, innovation and entrepreneurship, and industry-university-research cooperation. The basic cognition module includes clothing material and performance cognition, basic cognition of fashion design art, ergonomic cognition, cognition of clothing structure process, cognition of clothing equipment and operation, etc. The clothing model design system should realize automation and intelligent patterning, not only need to use the parametric pattern design method, but also need to rely on expert knowledge and experience.

Human body reconstruction based on 3D scanning is a widely used reconstruction method. By encapsulating the point cloud obtained by scanning, an accurate 3D human body mesh model can be reconstructed. Unity3D is a real-time 3D creation and operation platform, and its content functions are very Powerful, can be called to work in many fields. Many large domestic Internet companies, such as Tencent and NetEase, are using this platform to create games. Comment on the overall effect of the dress by yourself or a friend who accompanies the shopping. However, the evaluation of whether the color of clothing matches one's own requires some professional artistic knowledge and literacy, and ordinary consumers generally do not have.

2.2 The B.Fashion Design Professional Practice Network Training

On the one hand, through anthropometric measurements, we have mastered the data of various parts of the human body, so that the size of the panel design can be based on evidence; The premise of clothing board design. Everyone's body is different. Therefore, it is necessary to match according to the real data of the customer, establish a file according to the personal body data, and match the corresponding body model from the database in the platform.

During data entry, customers can manually input their own body data on the platform. Learning Scenario 1 Set up a fashion design studio: Arrange teaching in the way of setting up a fashion design studio. Through the training of new employees and preparation for the opening of the studio, the basic knowledge of clothing three-dimensional design and the preparation of utensils are completed. Physically, color is the characteristic of visible light, physiologically it is the different stimulation of visible light to vision, and psychologically it is Visible light stimulates the brain's response. Studies have shown that the retina contains three different cone cells, which contain three visual pigments that sense red, green and blue.

The co-occurrence network between institutions and countries is analyzed, and the cooperative relationship in the research field is analyzed. Finally, the knowledge evolution and hot trend of digital twin research are analyzed through the co-citation and keyword co-occurrence network., creative dress design, knitted clothing design, clothing product design, home textile product design, pattern design, etc.

2.3 The C.Digital Twin Research for Fashion Design Majors

Practical courses include intensive, verifiable practical courses and skills-centered practical courses attached to theory. They are compulsory practical content and constitute the main learning content and credits of the four-year university. Through this platform, each independent practice course can be integrated horizontally and continued vertically, such as the integration of fabric reconstruction practice with draping and dress design. In this method, the human body data and the body shape judgment results given by experts are used as the input and output of the network, respectively, and the body shape evaluation prediction is given according to the human body data, and it is compared with the output value, and the obtained error is used as the next prediction. Based on the revision, another survey found that: 54.4% of people are willing to accept new things, 20.8% are very happy, and no one is unwilling to accept new things, indicating that most consumers have the desire to accept new things, which is very Conducive to the promotion of 3D virtual fitting system. Since the dataset used in this chapter does not contain any texture information, and previous studies have shown that a single mask image or contour cannot provide sufficient shape information

3. CONCLUSION

In this method, the human body data and the body shape judgment results given by experts are used as the input and output of the network, respectively, and the body shape evaluation prediction is given according to the human body data, and it is compared with the output value, and the obtained error is used as the next prediction. Based on the revision, another survey found that: 54.4% of people are willing to accept new things, 20.8% are very happy, and no one is unwilling to accept new things, indicating that most consumers have the desire to accept new things, which is very Conducive to the promotion of 3D virtual fitting system. Since the dataset used in this chapter does not contain any texture information, and previous studies have shown that a single mask image or contour cannot provide sufficient shape information

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