Application of Artificial Intelligence Technology in Clothing Human Body Database

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ABSTRACT

This article summarizes and analyzes the current situation of clothing human database technology and application of AI technology of the clothing human databases' using, and looks ahead to the development trend of AI and clothing human body database in future. By means of literature searching, this article mainly investigates the Chinese clothing human body databases and makes analytical comparisons between the AI applied in the construction of clothing human body database, such as data mining and neural network, and database architecture. Within AI, the processing and management of data in the clothing human body databases and the function of size database-basing classification can be improved in the big data environment. Through the investigation and analysis of the clothing human body databases, the article concludes that the AI should be combined with clothing human body databases and new technology should be used to optimize and develop the databases in future.

Keywords: Clothing Human Body Database, Artificial Intelligence Technology, Body Size Database-basing Classification

INTRODUCTION

The research on the clothing human body database began in the middle and late 20th century. With the development of 3D scanning equipment and database technology, the research on the clothing human body databases is booming. Many human body databases of clothing industry are developed by apparel enterprises and universities in China with the orientation to research and manufacture. The research and development of the most of clothing human body databases are for MTM or e-MTM, which implements efficient clothing customization through human body scanning and data processing.

THE RESEARCH STATUS OF CLOTHING HUMAN BODY DATABASES

The research and development of clothing human body databases in China are mainly based on MATLAB, Visual C++, JAVA, python and other programming software and languages. The clothing human body datebases can be designed and developed on platforms, like web sever-side and client software on PC, via databases, say SQL Server, MySQL, Oracle etc., and C/S or B/S architecture. Assited by implementations above, users can also add, delete, check and change data and implement other functions. Apart from that, the clothing databases are reinforced by AI technologies such as machine learning and computer vision so as to analyze datas with the databases and apply those datas for better production.

Since 2004, Donghua University has developed a variety of clothing human body databases for MTM production. With the assistance of database software, like Microsoft Access and Oracle9i, coupled with UML users can build the model of database. And architectures such as J2EE and programming languages like JAVA and VB can contribute to object-relational clothing human body database based on 3D scanning or manual measurement(Li et al. 2005). The database implements the complex objects and storage methods, and inheritance mechanism construction and implementation. Finally, the data extraction and analysis of the clothing human body database, algorithm-based body shape classification, apparel pattern optimization and the 3D human online-modeling can be realized through web sever-side and software(Ling, 2005) (Shi, 2010).

Huang Xinmin et al. (2013) designed and developed a human body database system and platform of 3D anthropometric data based on Model, View and Controller based on MVC. Li Pan et al. (2014)developed a clothing human body database management system based on non-contact anthropometry by using C# language and SQL database and C/S architecture, which stores 108 items of the data obtained from 3D human body scanning, and achieved object-oriented online data searching and human body graphic analysis. Lei Qiran (2020) used Logistic regression, artificial neural network and CATR decision tree algorithm to classify and code the height, chest circumference and weight of the subjects, established the corresponding model recommendation library, and used virtual fitting software to visualize model after data screening and analysis of the male human body data obtained from 3D scanning. Shi

Xiaping et al. (2013) extracted more than 700 human body models from the existing clothing human body database, calibrated the key sections of human body models and extracted the corresponding human body characteristic parameters, established the clothing human body sample database, and finally realized the fitting of the corresponding human body platform through the template matching algorithm. Xiaoning Jing (2014) used 3d scanning to collect 24 major measurements of women and built a clothing human body database. Basing on the customer's image capture and data extraction, the image data could match the existing data in the database, thus the anthropometric information closest to the customer samples can be used to meet consumers' demands and increase the productivity.

APPLICATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN CLOTHING HUMAN BODY DATABASE

As early as 1999, a Chinese scholar Liu Yingqun (1999) proposed a cross-study of artificial intelligence technology and database technology, which could achieve high-efficiency data management and data processing through machine learning. This article mainly introduces the application of data mining technology and machine learning neural network technology in clothing human body database.

Application of Data Mining Technology in Clothing Human Body Database

With the advent of big data era, data has become a basic resource, and it is becoming increasingly important for data management and application. The realization of data mining and expansion on the basis of known data is also an important part of data management and processing. Through the use of data mining technology, key data extraction and corresponding analysis on the basis of existing data can be realized. Extracting the corresponding data from the clothing human body database can optimize the clothing size based on the body size and improve the feasibility of its application (Shao, 2021).

Li Guoliang et al. (2021) summarized and prospected AI-oriented data management technology, analyzed the problems faced by artificial intelligence in data management, and proposed optimization algorithms and calculation engines to achieve algorithms and corresponding functions at the least cost. Under the help of Monte Carlo method, Hu Juan (2019) based on the existing male body data samples and used the estimator and the correlation coefficient matrix to generate human body size simulation data through the maximum likelihood estimation method, and finally achieved the human body classification and body types system. Yin Zhe (2020) used python to build a multiple linear regression model and introduced the scoring function of the machine learning library for optimization, which realized the optimization of the acquisition of the seventh cervical vertebra point height based on non-contact measurement. China Normal Institute of Standardization (2020) extracted additional feature data from existing databases, classified them into training set and prediction set,

trained the training set through a sample model, then clustered the predicted size data and extracts. After judging that the error value is less than the error threshold, the best cluster group could be used to perform data training based on the existing database to achieve the function of predicting size data.

Application of Neural Network in Clothing Human Body Database

The data classification method based on deep learning generally comes from the learning of various neural networks. After the data is recognized and classified by the neural network in deep learning, a better data-based classification can be achieved.

Ren Tianliang (2009) developed a clothing human body database, and designed the corresponding archiving software based on it. He then processed through the K-means clustering algorithm and accomplished the corresponding functions of the human body archiving module by using BP neural network. The functions are finally optimized by the L-M algorithm applied for documentation model of garment size categorization. Based on three-dimensionally scanned young women, Jin Juanfeng et al. (2019) extracted and quickly clustered the feature information of the hips into 5 categories, designed and constructed a PNN recognition model with recognition function, and conducted training and testing to realize the effective detection and classification of young women's hips. Liu Weimin et al. (2018) took men's trousers as an example, and used BP neural network algorithm to parametrically design the change rules of human waist and hips. After training, the corresponding change rules were obtained and applied to intelligent clothing production. Zhang Li (2017) collected data through 3d scanning technology and established a clothing body information database, then used fuzzy C-means algorithm and K-means algorithm for clustering and extreme learning machine (ELM) algorithm to achieve more efficient body shape recognition.

SUMMARY AND OUTLOOK

With the advent of the big data era, extracting various useful information on the basis of data management has become an indispensable part of the product production and development process. This article explores and studies the new artificial intelligence technology in the current clothing human body database, and concludes that the management and expansion of clothing human body data through AI technology can make clothing produced under the help of data more in line with people’s needs and make fitter clothing come true.

As the computer technology flourishes today, new efficient database architecture and new multi-functional data management technologies are also witnessing rapid progress. The combination between artificial intelligence technology and the clothing human body database and the utilization of new technologies to optimize and develop the future new clothing human body database has become the overall development trend of the clothing human body database.

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