Artificial Intelligence Simulation Research Based on Aviation Flight Training Technology

Peng Zhang¹,*

¹Hubei Communications Technical College, Hubei, China, 430079

*Corresponding author e-mail: zhangpeng@hbjtzyjshy1.onexmail.com

Abstract: The evaluation of flight teaching quality management is not only for students, but also for teachers. Teachers use a teaching model in long-term teaching. This teaching model may be suitable for some students, but it may not be suitable for all students. Through the evaluation of the rationality of the content of the teacher's explanation in the class, the time of the course, the enthusiasm of the students in the class, the mastery of the theoretical knowledge of the students after the class and the level of the students' flying skills, teachers can clearly understand their own deficiencies in teaching. Corrections in a targeted manner. During the flight, students often have negative psychology that is contrary to flight safety due to the long-term application of a single flight technology. The existence of this kind of psychology can easily bury hidden flight hazards and affect the flight effect of students in formal flight. Therefore, instructors should improve the level of professional skills of students, pay attention to cultivating rigorous flying style and use artificial intelligence technology to train strong professional skills and work hard. Improve the level of manipulation. At the same time, it is also necessary to establish the flying awareness of students "persist in being unsafe and not flying, if you want to fly, you must be safe".

Keywords: Flight, Training, Management

1. Introduction

Flight simulation training equipment is a commonly used auxiliary training equipment in pilot training. It can simulate the visual, auditory and tactile sensations produced by specific aircraft (such as Airbus A320, Boeing 737NG, etc.) during flight, bringing real life to pilots Immersion. Airlines widely use flight simulation training equipment to improve the safety and efficiency of pilot training, improve the quality of pilot training and reduce flight safety risks. In order to ensure the normal operation of the equipment, two groups of maintenance personnel are set up to manage the equipment in each computer room and establish¹ A set of web-based B/S mode flight simulation training equipment maintenance and management system is developed, which records the operation status of the flight simulation training equipment, patrol inspections, failure conditions and aircraft inspections after training. Through the network management method, the maintenance personnel are strengthened to grasp the operation status of the flight simulation training equipment, track the operation failure of the flight simulation training equipment in real time and strengthen the mutual communication and
assistance of the maintenance personnel. In order to save the record file of the operation quality of the flight simulation training equipment, the recording method of manual data collection is adopted. Every month, a dedicated person will count the relevant data in the equipment maintenance management system (such as flight simulation training equipment status inspection before and after training, patrol inspection, flight simulation training equipment duty guarantee, etc.) to form a new Ex-cel file for storage. However, this method has problems such as high labor costs and low work efficiency. Therefore, the automatic statistical work of flight simulation training equipment guarantee data is designed based on the Python programming language. Taking flight simulation training equipment on-duty guarantee as an example, completes the record of flight simulation training equipment data and completes the file statistical storage of related records conveniently and quickly.

2. Aviation flight computing technology

The broadband multimedia trunking system private network serves as the specific carrier wireless platform for services. The overall wireless network architecture is divided into three layers: control center layer, base station layer and terminal layer. (1) Control center layer. Arrange the core network equipment in the control center to connect with the application servers, video servers and base station BBUs in the center through Ethernet switch interfaces. In the control center subsystem, each professional application subsystem is connected to the core network unit through a router to realize the communication between the control center and the wireless terminal side. As the core processing unit of the entire network, the core network equipment is responsible for the management and control of the entire network subunit. (2) Base station layer: The equipment included in the base station system is: base station equipment BBU (Base band Unit) equipment and RRU (Radio Remote Unit) equipment to cover the operating area. The BBU equipment is connected to the RRU equipment through optical fiber and each base station is connected to the network switch through Fast Ethernet and is connected to the control center through the channel provided by the communication transmission system. According to the requirements of wireless signal coverage, RRU equipment is arranged indoors and wireless coverage is extended through RRU+plate antennas and indoor wireless data communication. (3) Terminal layer: Terminals are divided into handheld terminals, vehicle-mounted terminals and CPE terminals. The network management model is shown in the figure below.

![Network management model](image)

### Figure 1. Network management model

3. Artificial intelligence flight management technology

Improving teaching quality is the starting point of all teaching. In all aspects of teaching, teachers need
to focus on improving teaching quality. The quality of teaching is the main factor in the evaluation of teachers and schools by the outside world. To improve teaching quality, we must first manage teaching quality. Teaching quality management is the process of arranging teaching activities in accordance with the requirements of training objectives and controlling the quality of each stage and link of the teaching process\cite{4}. There are many problems in the current teaching quality management: First, the school does not pay enough attention to the teaching quality management. The personnel who manage the teaching management are often part-time from other positions, so they do not have enough energy to manage. At the same time, these personnel are not professional, have low work efficiency and poor management, so effective teaching quality management cannot be achieved. Secondly, the teaching quality management system of most schools is not perfect, which leads to the unclear division of labor of management personnel and fuzzy evaluation standards, which makes it impossible to effectively implement teaching quality management. Teaching quality management can not only determine teaching goals based on actual conditions, but also improve teaching quality and directly establish talent training models. Therefore, in the teaching process, we must pay attention to teaching quality management to ensure the effectiveness of teaching quality. The flight data processing model is shown in the figure below.

Figure 2. Network management flight model

4. Artificial intelligence simulation flight training

4.1. Aircraft modeling technology can improve the quality of ground control motion

Aircraft modeling technology includes mechanism modeling, system identification modeling and a compromise between model accuracy and control system design. System identification modeling is a method of identifying aircraft aerodynamic parameters. This method is susceptible to the increased difficulty of work, repeated tests, continuous processing of data and information due to more aerodynamic parameters and the limited scope of application of the identification results. Replaced by mechanism modeling\cite{5}. Mechanism modeling is a method of applying aerodynamics and flight mechanics to study the aircraft's ground taxi phase. It includes a six-degree-of-freedom model, a
nonlinear model and a dynamics model. This method consists of a simple two- or three-degree-of-freedom model. It was developed into a six-degree-of-freedom model and taking into account the aerodynamic force and the force factors in the aircraft's ground taxi phase, the transition from rigid modeling to elastic modeling was realized. Aircraft system modeling is to present the real motion characteristics of the aircraft and guide the design and development of the control system. The higher the complexity and accuracy of the model, the closer it reflects to the real system, but it also leads to the design and implementation of the control system. The greater the complexity factor, therefore, it is necessary to establish a compromise between model accuracy and control system design. In short, aircraft modeling technology can improve the quality of aircraft ground control motion. The computer data processing model is shown in the figure below.

![Figure 3. Network management data model](image)

4.2. Flight control technology can improve flight performance and quality

Flight control technology is the core technology of flight control system, including classical design theory based on time domain response and root locus and modern control theory represented by dynamic inverse control, robust control, adaptive control, etc. Classical design theory is mainly used for aircraft with weak longitudinal and lateral coupling and lower maneuverability requirements. The method is simple, but it cannot meet the entire flight index requirements of modern aircraft. Modern control theory is theoretically suitable for the flight requirements of modern aircraft. However, due to the influence of modeling technology, it is still unable to be applied to actual engineering. Only by combining the two and complementing each other can the aircraft’s flight performance and quality be improved[6].

5. Conclusion

my country's civil aviation industry is developing rapidly with the progress of the times, so people are focusing more on the training of pilots' flying style, in order to effectively prevent the emergence of aircraft flight safety problems from the root. This requires flight instructors to teach the students basic knowledge and practical operation skills and at the same time devote more energy to the initial stage of training the students' flying style, so that the students can deeply imprint the correct flying style in their hearts. It can promptly and effectively solve various unexpected flight problems, ensure the smooth completion of flight activities and promote the steady development of flight education in my country.

References
[1] Julius Keller, Flavio Mendonca, Jason Cutter, Mike Suckow, Brian Dillman. Justification and development of competencies to transform a collegiate aviation flight program[J]. The Journal of Competency Based Education, 2020, 5(3).

[2] Belarusian Defense Ministry announces start of military aviation flights as part of border patrol (Part 2)[J]. Interfax: Russia &amp; CIS Military Newswire, 2020.

[3] Nanotechnology - Quantum Dots; Civil Aviation Flight University of China Details Findings in Quantum Dots (Kondo-assistant Aharonov-bohm Transport In a Quantum Dot-majorana Wire System)[J]. Nanotechnology Weekly, 2020.

[4] Engineering; Researchers from Civil Aviation Flight University of China Report Findings in Engineering (Robust Image Segmentation Using Fuzzy C-means Clustering With Spatial Information Based On Total Generalized Variation)[J]. Journal of Mathematics, 2020.

[5] Aerospace Research - Aircraft Engines; New Data from Civil Aviation Flight University of China Illuminate Findings in Aircraft Engines (Numerical Study of Super-cooled Droplet Impingement On Aeroengine)[J]. Defense &amp; Aerospace Week, 2020.

[6] Science; Data on Science Reported by Researchers at Civil Aviation Flight University of China (Novel Mos2-dopo Hybrid for Effective Enhancements On Flame Retardancy and Smoke Suppression of Flexible Polyurethane Foams)[J]. Chemicals &amp; Chemistry, 2020.