

Monitoring and Adjusting Athletes' Psychological States Based on Artificial Intelligence Algorithms

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Abstract: To promote the monitoring and adjustment of athletes' psychological states and ensure their mental health, this paper mainly analyzes artificial intelligence algorithms. Based on the mechanisms of artificial intelligence algorithms, it explores methods for intelligent monitoring of athletes' psychological states. Based on the monitoring results of athletes' psychological states using artificial intelligence algorithms, it further proposes suggestions for adjusting psychological states that are beneficial to athletes' mental health, promoting the intelligent implementation of mental health services for athletes.

Keywords: Artificial Intelligence; Athletes' Psychology; Psychological State Monitoring; Psychological Adjustment

Since the 21st century, artificial intelligence has developed rapidly and gradually integrated into many fields such as mental health services, sports management, education and technology, and healthcare, becoming a major driving force for the transformation of production scenarios and service models in various industries. Monitoring and adjusting athletes' psychological states is a key task in athlete training. Universities, as the main base for athlete training, actively utilize artificial intelligence technology to monitor athletes' psychological states during daily training, which helps dynamically, in real-time, track and understand each athlete's psychological changes. Through artificial intelligence algorithms, teachers or instructors can promptly detect athletes' psychological problems and create more precise and comprehensive mental health service plans, better correcting athletes' psychological issues and providing psychological attention and services to them. This paper explores the methods of artificial intelligence algorithms in monitoring and adjusting athletes' psychological states, providing references for athlete training and sports education in China, and promoting the innovation of psychological monitoring methods in athlete training.

1. Overview of Artificial Intelligence Algorithms

Artificial intelligence (AI) is an important branch of computer science, a science and technology that can simulate the human brain and extend various intelligent services. Artificial intelligence algorithms, also known as soft computing, are algorithms that, based on artificial intelligence systems, seek to simulate and solve problems according to the laws and characteristics of nature.

Currently, the main artificial intelligence algorithms include artificial neural network genetic algorithms, simulated annealing algorithms, swarm intelligence ant colony algorithms, example swarm algorithms, polymorphic analysis methods, and multi-model reasoning methods. Among them, the artificial intelligence algorithms used in the field of psychological health monitoring and services involve polymorphic analysis methods and multi-model reasoning methods. These methods, based on dynamic changes in facial information, key position detection, polymorphic analysis, and multi-model reasoning, intelligently monitor and analyze human psychological states.

2. Monitoring Athletes' Psychological States Based on Artificial Intelligence Algorithms

2.1 Building an AI System for Monitoring Athletes' Psychological States

In monitoring human psychological states using artificial intelligence algorithms, the dynamic changes in facial information, key position detection, polymorphic analysis, and multi-model reasoning are core technical supports. Based on this, when setting up a psychological monitoring AI system in universities, the focus is on using these technical modules to build an AI system that relies on facial emotion recognition. To recognize the emotions of athletes during daily training, face data acquisition devices are needed. Therefore, well-designed face recognition cameras using the AVS03A+Sony scheme are used to design the equipment for

the AI system for monitoring athletes' psychology. Based on the daily training content and venues of school athletes, psychological monitoring AI system equipment is installed in the athletes' activity areas.

2.2 Using AI Systems to Monitor Athletes' Daily Training PsychologyAI

Monitoring athletes' psychological states mainly involves observing their daily training psychological activities. After building the basic AI system for psychological monitoring, a complete system operation framework is set up, including a control center, warning subjects, data acquisition, psychological analysis, and psychological warning (as shown in Figure 1). In this system, the instructor is the manager of the control center, responsible for the operation, management, and maintenance of the psychological monitoring AI system. University athletes are the warning subjects, the data acquisition section includes depth data and data preprocessing. After the AI system acquires the emotional data of the warning subjects, it classifies them intelligently, analyzes, and describes the psychological states, detecting if the warning subjects have adverse psychological factors and issuing alerts if anomalies are found.

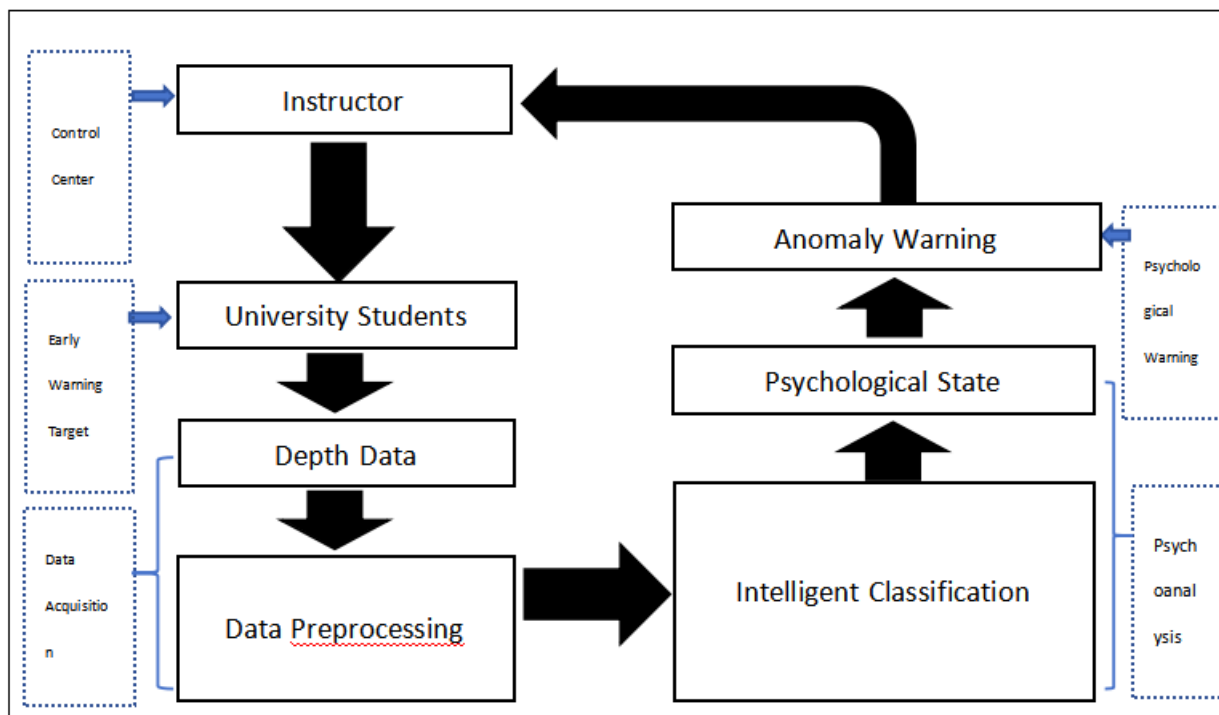


Figure 1 Overall Architecture of the AI System for Psychological Monitoring

3. Adjusting Athletes' Psychology Based on AI Algorithm Monitoring Results

3.1 Resolving Athletes' Negative Psychological States Based on AI Monitoring Results

The psychological states of athletes affect their daily training effectiveness and their participation in various sports competitions. University instructors, as the main persons responsible for guiding and managing student-athletes' daily training, should use the psychological monitoring AI system to monitor student-athletes' psychological activities and identify athletes with abnormal psychological states. For athletes with abnormal psychological states, instructors should promptly talk to them, understand their psychological problems and causes through in-depth communication, and develop appropriate resolution plans. For example, for athletes who are overly nervous, excited, or anxious before a competition, the focus is on providing psychological relief, guiding them to view each competition with a normal mindset, and reducing tension. For athletes showing negative, angry, or dissatisfied emotions during daily training, the AI system can identify these emotional characteristics through facial recognition and alert the instructor. The instructor can then talk to the athlete individually, understand the deeper reasons, provide psychological comfort, and adjust the training intensity to alleviate the athlete's psychological pressure.

3.2 Providing Psychological Adjustment Guidance to Athletes with AI Algorithm Support

Resolving athletes' adverse psychological states requires not only proactive intervention by instructors but also intelligent support from AI algorithms. Athletes should be taught psychological adjustment techniques, given psychological education and guidance, enabling them to self-adjust psychologically during daily training or competitions, maintaining an optimal mental state. For instance, if the psychological monitoring AI system detects that an athlete has low stress resistance or negative self-doubt in adverse situations,

the AI can provide psychological adjustment plans, teaching the athlete self-psychological adjustment techniques. These techniques include facing adversity correctly, understanding that “adversity is normal, success is unexpected,” and using positive self-suggestions during competitions. By mastering and using psychological adjustment skills such as arousal level adjustment, concentration, imagery rehearsal, and self-suggestion, athletes can effectively cope with various adverse situations.

3.3 Developing a Music Function in the Psychological Monitoring AI System to Adjust Athletes’ Psychology

Modern neuropsychological research shows that music has a significant regulatory effect on the nervous system and psychology of humans. Functional music can influence heart rate, blood pressure, skin potential, muscle potential, endocrine and biochemical substances (adrenaline, noradrenaline, endorphins, immunoglobulins), and brain waves. For instance, adding a “music psychological adjustment” function to the psychological monitoring AI system, instructors can add this function to the system. Once the AI system detects adverse psychological factors in the warning subjects, it will automatically analyze and classify, and recommend the optimal music playlist based on the subjects’ psychological state and problem tendencies. Instructors can play corresponding music for athletes, allowing them to complete sports training in different music scenarios, adjusting their psychological and emotional states.

4. Conclusion

In summary, psychological states affect every athlete’s daily training, and mental health is a basic quality guarantee for athletes in their sports careers. Currently, there are numerous practices in China using artificial intelligence algorithms for monitoring and adjusting athletes’ psychological states, and these algorithms are demonstrating their technological power. Universities, bearing the great mission of training athletes, should actively explore the application of artificial intelligence algorithms in monitoring athletes’ psychological states. By designing AI system equipment that can monitor athletes’ psychological states based on dynamic facial information changes, key position detection, polymorphic analysis, and multi-model reasoning, and applying it in daily training management, we can dynamically track each athlete’s psychological changes and provide timely adjustments based on identified psychological issues.

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