

Application of Artificial Intelligence in Physical Education and Sports Performance Enhancement

Dr. Sambhaji Bhonsale

Ph.D. Supervisor, RTMNU, Nagpur

Mr. Atul Wankhede

Research Scholar, RTMNU, Nagpur

Email & Contact: atulwankhede2011@gmail.com

Abstract

Artificial Intelligence (AI) is transforming the field of physical education and sports sciences. AI-based systems are increasingly used in performance analysis, injury prediction, talent identification, and personalized training programs. This paper explores the application of AI technologies in physical education, highlights real-world examples, and discusses their role in injury prevention and talent acquisition. The study concludes that AI enhances decision-making, improves athlete performance, and supports scientific coaching methods.

Keywords: Artificial Intelligence, Physical Education, Sports Analytics, Injury Prevention, Talent Identification, Machine Learning

1. Introduction

Artificial Intelligence (AI) refers to computer systems that can perform tasks normally requiring human intelligence. In physical education and sports, AI helps in:

- Performance tracking
- Biomechanical analysis
- Fitness monitoring
- Injury risk prediction
- Talent scouting

With wearable technology and data analytics, AI is becoming an essential tool in modern sports science.

2. AI in Physical Education and Sports Applications:

Area	AI Application	Example
Skill Analysis	Motion tracking	Video-based movement
Fitness Assessment	Wearable sensors	Heart rate monitoring
Coaching	Performance analytics Game strategy	Coaching
Physical Education	AI fitness apps	Personalized workout

3. Role of AI in Injury Prevention and Health Management

AI helps in predicting injuries by analyzing:

- Training load
- Muscle imbalance
- Fatigue levels
- Previous injury data

Example:

AI software analyzes running patterns and detects abnormal knee angles, predicting ACL injury risk.

Injury Prediction Model Table:

Parameter	Traditional Method	AI-Based Method
Injury Detection	After injury occurs	Before injury risk
Data Use	Manual observation	Real-time sensor data
Accuracy	Moderate	High (Data-driven)

4. AI for Talent Identification and Acquisition

AI analyzes:

- Speed
- Agility
- Strength
- Game intelligence
- Match statistics

Example in Cricket:

AI tracks batting strike rate, shot selection, reaction time and predicts future performance potential.

Talent Identification Comparison:

Criteria	Traditional Scouting	AI-Based Scouting
Selection Basis	Coach observation	Data + Algorithms
Bias	Possible	Reduced
Coverage	Limited	Large dataset analysis
Efficiency	Time-consuming	Fast & Accurate

5. Benefits of AI in Physical Education

- Scientific training programs
- Personalized fitness plans
- Reduced injury rates
- Improved performance accuracy

- Better evaluation of students

6. Challenges

- High cost
- Data privacy issues
- Lack of technical knowledge among PE teachers
- Dependence on technology

7. Conclusion

Artificial Intelligence is revolutionizing physical education and sports sciences. It supports coaches, enhances athlete performance, prevents injuries, and identifies talent effectively. Physical education institutions should integrate AI-based systems for modern and scientific development of sports.

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