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FROM PLAYGROUND TO ALGORITHM: ARTIFICIAL INTELLIGENCE, SPORTS TALENT IDENTIFICATION AND INEQUALITY AMONG CHILDREN

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ABSTRACT

Talent identification in children's sport has traditionally depended on coaches' observations, competition results, physical testing and developmental assessments. Artificial intelligence (AI) is introducing a new model in which movement data, anthropometric characteristics, performance trajectories and training patterns can be analysed to predict sporting potential. Recent research indicates growing interest in machine learning for youth talent identification, although the evidence remains concentrated in selected sports and is limited by issues of data quality, external validation and interpretability. A 2026 systematic review identified 27 studies of machine learning in youth team-sport talent identification, with football accounting for 13 studies.

AI could potentially democratize talent identification by identifying children whose abilities may be overlooked by conventional selection systems. However, algorithmic selection may also reproduce existing inequalities when training datasets are socially unrepresentative or when disadvantaged children have less access to organized sport, quality coaching, wearable technologies and digital infrastructure. This article examines AI-based talent identification from a sociological and child-rights perspective. It argues that algorithms do not discover talent independently of society; rather, they interpret data generated within unequal social environments. The paper proposes a **Child-Centred Algorithmic Sports Equity Model (CASE Model)** based on equity, transparency, accessibility, human oversight and child participation. The central question is therefore not only whether AI can identify talent, but **whose talent becomes visible when algorithms decide what counts as talent**.

Keywords: Artificial Intelligence; Sports Talent Identification; Children; Inequality; Algorithmic Bias; Digital Divide; Gender; Social Justice; Youth Sport

1. INTRODUCTION

Sport has historically provided children with opportunities for physical development, social participation, discipline and upward mobility. Talent identification determines, to a significant extent, which children receive access to advanced coaching, academies, competitions and

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sporting careers. Traditionally, this process has relied on coaches, scouts and standardized physical assessments. Although such methods are subjective, they allow experienced professionals to consider factors that cannot easily be reduced to numerical measurements, including motivation, adaptability, creativity and developmental potential.

Artificial intelligence is changing this process. Machine-learning systems can integrate multiple variables simultaneously and identify patterns that may not be immediately visible to human observers. Recent research suggests that AI is increasingly being investigated for developmental-potential identification, performance prediction and player selection.

This technological development presents an important sociological question. If AI is trained on existing sporting data, it may reproduce the inequalities embedded within those data. Children who have access to professional coaching, sports academies, nutrition, equipment and competitions may generate richer performance records than children from low-income communities. Consequently, the algorithm may interpret **access to opportunity as evidence of talent**.

The issue is therefore larger than technological accuracy. It concerns equality of opportunity, social mobility and the definition of sporting talent itself.

2. PROBLEM STATEMENT

The fundamental problem is that AI-based talent identification may appear objective while operating within socially unequal environments. An algorithm can process data without personal prejudice, but the data from which it learns may already reflect economic, geographical, gender and institutional inequalities.

Children from affluent families are more likely to have access to organized sport, specialist coaching, sports equipment, competitions and technology-assisted training. Children in rural or economically disadvantaged communities may possess significant sporting ability but have fewer opportunities to produce the data required by an AI system.

This creates a potential **algorithmic visibility gap**. A child who trains regularly in a well-resourced academy may generate thousands of observations through wearable devices, video analysis and performance testing. Another child with comparable or greater natural potential may have almost no digital performance history. If the algorithm interprets data availability as

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evidence of potential, the second child becomes statistically invisible.

This is particularly significant because physical inactivity and participation in sport are themselves socially patterned. WHO reports that approximately four in five adolescents globally do not engage in sufficient physical activity, while girls and children facing socioeconomic disadvantages are particularly affected by unequal opportunities for activity.

AI therefore enters an already unequal sporting environment.

3. RESEARCH GAP

The literature on AI and talent identification is developing rapidly, but important gaps remain. A recent systematic review of machine learning in youth team-sport talent identification found only 27 eligible studies from 228 records. Football accounted for 13 of these studies, while evidence across other sports remained comparatively limited. The review also identified concerns regarding validation, interpretability and the multidimensional nature of youth development.

More importantly, technical studies tend to ask whether an algorithm predicts performance accurately, rather than whether the underlying selection process is socially equitable. Questions concerning socioeconomic status, geographical location, gender, disability, access to technology and unequal sporting infrastructure remain insufficiently integrated into AI talent-identification research.

UNICEF's 2025 guidance on AI and children specifically emphasizes that AI systems should prevent discrimination, protect children's data, ensure representation of children from different socioeconomic conditions and regions, and provide transparency and accountability.

The research gap can therefore be expressed as follows: **there is insufficient research connecting the technical performance of AI talent-identification systems with the social conditions under which children's sporting data are produced.**

4. RESEARCH QUESTIONS

This study addresses five questions: Can AI improve the identification of sporting talent among children? Does algorithmic selection reduce or reproduce social inequality? Which children are most likely to be excluded from AI-based systems? How can gender, disability, socioeconomic and geographical bias be addressed? Finally, should AI ever make

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autonomous decisions about a child's sporting future?

5. METHODOLOGY

This article adopts a **narrative review and sociological conceptual analysis**. Recent peer-reviewed literature on AI and youth talent identification was examined alongside international evidence concerning children's rights, physical activity and inequality. Particular attention was given to systematic reviews and guidance from international organizations.

The analysis does not attempt to calculate the predictive accuracy of a particular AI model. Instead, it examines the social conditions surrounding algorithmic selection and develops a conceptual framework for equitable implementation.

6. FROM HUMAN SELECTION TO ALGORITHMIC SELECTION

Traditional talent identification is often criticized for subjectivity. Coaches may consciously or unconsciously favour children who are physically mature, confident, well connected to sporting institutions or already exposed to competitive environments. AI appears to offer a solution because it can process standardized measurements consistently.

However, replacing human judgment with algorithms does not automatically eliminate bias. If the data used to train an algorithm contain historical inequalities, the algorithm may reproduce them at scale.

For example, relative age and biological maturation can affect youth sporting performance. A physically mature 13-year-old may outperform a less mature peer despite having different long-term developmental potential. Similarly, children with better coaching may perform better on technical tests because they have had greater opportunities to practice.

Thus, **performance data are not socially neutral data**.

The algorithm may accurately predict who is most likely to succeed within the existing system without identifying who possesses the greatest underlying potential.

7. INEQUALITY AND THE DIGITAL DIVIDE

The first major inequality concerns socioeconomic status. Advanced sports technologies

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require devices, software, internet connectivity and trained personnel. These resources are more readily available in elite academies and well-funded schools.

The second concerns geography. Children in major cities may have access to multiple sports academies and competitions, whereas rural children may have limited facilities even when their physical abilities are exceptional.

The third concerns gender. WHO evidence shows persistent differences in physical activity between boys and girls and identifies social, economic, cultural and environmental factors as contributors to these differences. An algorithm trained primarily on male sporting datasets may therefore fail to recognize female talent appropriately.

The fourth concerns disability. Children with disabilities may be underrepresented in datasets, while conventional performance metrics may not adequately capture adaptive sporting ability. UNICEF identifies inclusion and accessibility for children with disabilities as important dimensions of responsible AI.

These inequalities demonstrate that simply collecting more data is not enough. UNICEF explicitly warns that additional data can reproduce existing biases when the underlying collection and labelling processes are themselves biased.

8. THE CHILD-CENTRED ALGORITHMIC SPORTS EQUITY MODEL

This paper proposes the **CASE Model—Child-Centred Algorithmic Sports Equity Model**:

Child → Data → AI Analysis → Talent Prediction → Human Evaluation → Opportunity

The first principle is **equity**. Talent-identification systems must deliberately include children from different socioeconomic, geographical, gender and ability groups.

The second is **transparency**. Children, parents, teachers and coaches should understand what data are being collected and how they influence selection.

The third is **accessibility**. AI should not become available only to children attending expensive academies. Public schools and community sports programmes should also have access to appropriate assessment opportunities.

The fourth is **human oversight**. AI should make recommendations rather than autonomous decisions about a child's sporting future. Coaches should be able to challenge algorithmic

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recommendations and consider developmental factors that the model cannot measure.

The fifth is **child participation and consent**. Children should receive age-appropriate explanations about data collection and should have meaningful opportunities to participate in decisions concerning their information. UNICEF's child-centred AI framework similarly emphasizes safety, privacy, non-discrimination, transparency, inclusion, wellbeing and child participation.

9. DISCUSSION

The sociological importance of AI talent identification lies in the possibility that algorithms may transform the definition of sporting merit. Historically, talent has been identified through human observation; increasingly, talent may be defined through what can be measured.

This creates a danger of **digital determinism**, in which children become classified according to algorithmic scores at an early age. A low prediction could influence a coach's expectations, reduce opportunities and ultimately become self-fulfilling. Conversely, a high prediction could place excessive pressure on a child.

AI should therefore be treated as a tool for discovering possibilities rather than assigning permanent labels.

The strongest potential benefit is that AI could challenge conventional scouting networks. A carefully designed system could identify promising children outside traditional academies and provide them with opportunities. However, this will occur only if datasets deliberately include children who have historically been underrepresented.

The central sociological insight is therefore that **AI cannot be more objective than the social environment from which its data are produced**.

10. FUTURE RESEARCH

Future research should move beyond model accuracy and investigate the real-world consequences of algorithmic selection. Longitudinal studies should examine whether AI-selected children actually demonstrate greater long-term sporting development and whether children excluded by algorithms subsequently succeed through alternative pathways.

Research should also compare AI systems across socioeconomic groups, genders,

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geographical regions and disability categories. Independent algorithmic audits should examine false-positive and false-negative rates across demographic groups.

A particularly important area is research involving children in government schools and low-resource communities. If AI talent identification is intended to democratize sport, its effectiveness must be tested among populations that have historically received fewer sporting opportunities.

Future research should also investigate children's own perceptions. Children should not merely be subjects of algorithmic systems; their experiences and opinions should influence the design of those systems.

11. CONCLUSION

Artificial intelligence has the potential to transform children's sports talent identification by combining large amounts of performance information and identifying patterns that may be difficult for individual coaches to detect. However, technological objectivity should not be confused with social equality.

An algorithm trained primarily on children who already possess access to organized sport, advanced coaching and technology may simply identify privilege more efficiently. The challenge is therefore not merely to build more accurate algorithms but to build **fairer sporting ecosystems**.

The CASE Model proposed in this paper places equity, transparency, accessibility, human oversight and child participation at the centre of algorithmic talent identification. AI should expand the pool of children whose potential can be recognized, not narrow it.

Ultimately, the most important question is not **"Can AI identify sporting talent?"** but rather:

"Whose talent gets recognized when algorithms decide who is talented?"

The answer will determine whether AI becomes a tool for democratizing children's sport or another mechanism through which existing social inequalities are reproduced.

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