Title: Applications of AIML in Healthcare and Biomedical Engineering: Challenges, Opportunities, and Solutions

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PROPOSAL

1. Introduction and Rationale:

Artificial Intelligence (AI) and Machine Learning (ML) have become transformative technologies in healthcare and biomedical engineering, offering solutions for disease diagnosis, personalized medicine, medical imaging, drug discovery, healthcare management, and patient monitoring. Despite their immense potential, challenges such as data privacy, interpretability, regulatory compliance, integration with clinical workflows, and ethical concerns remain significant barriers to large-scale adoption.

This special issue aims to provide a comprehensive platform to explore the current state, challenges, and future opportunities of AI/ML in healthcare and biomedical applications, with a special focus on child health, an area of critical global importance. Child health outcomes are shaped by a complex interplay of social, economic, environmental, and policy-related factors, and disparities remain a pressing issue across regions. By leveraging AI/ML-driven approaches, researchers and practitioners can design context-sensitive, scalable, and effective strategies to bridge these gaps and advance healthcare equity.

2. Scope of the Special Issue:

The thematic issue will:

- Address existing knowledge gaps in AI/ML applications for healthcare and biomedical engineering.
- Highlight cross-disciplinary research that integrates engineering, medicine, public health, and computational sciences.
- Explore context-sensitive AI/ML solutions for improving child health outcomes globally.
- Provide insights into ethical, social, and policy-related implications of AI/ML adoption in healthcare.

Topics of interest include, but are not limited to:

- AI/ML in medical imaging and diagnostics.
- Predictive modeling for child and maternal health outcomes.

- AI-driven personalized medicine and treatment optimization.
- Wearable technologies, IoT, and real-time health monitoring.
- Biomedical signal and image processing using AI/ML.
- AI for epidemiology, public health, and disease surveillance.
- Data security, privacy, and ethical considerations in AI/ML healthcare applications.
- Explainable and interpretable AI for clinical decision support.
- Applications of AI/ML in drug discovery and vaccine development.
- AI-based strategies for addressing healthcare disparities across regions

3. Potential Impact:

The proposed special issue will:

- Provide a comprehensive, interdisciplinary resource for researchers working at the intersection of healthcare, biostatistics, and biomedical materials.
- Highlight how AI/ML techniques are reshaping clinical practice, statistical medical research, and materials innovation.
- Encourage collaboration between disciplines traditionally siloed, leading to translational outcomes with direct societal and healthcare benefits.
- Serve as a reference point for both academia and industry, inspiring future research and applications.

4. Target Audience:

- The special issue will attract contributions from a broad community of researchers, clinicians, biomedical engineers, computer scientists, healthcare policymakers, and public health professionals interested in the integration of AI/ML with healthcare innovation.

Call for Papers: September 1, 2025

Submission Deadline: December 31, 2025