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Machine Learning–Driven Disease Detection and Bio-Surveillance in India: Implications for Public Health Preparedness and Sustainable Health Entrepreneurship

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Abstract: *Machine Learning (ML) technologies are increasingly upending the landscape of disease detection and bioterrorism surveillance in the world today through the rapid analysis of large amounts of clinical, biological, and environmental data. In the Indian context, where infectious diseases such as COVID-19 and a rising tide of cancers represent serious public health threats, ML technologies are revolutionizing diagnostic processes and preparedness against outbreaks. This paper examines the impact of ML technologies in enhancing the preparedness and viability of a sustainable health enterprise in Indian health care systems and infrastructure. Based on the lessons of AI-enabled COVID-19 surveillance systems and ML technologies in cancer screening, this analysis identifies the ways in which machine learning and deep learning algorithms and technologies of digital epidemiology contribute to the early prediction, automatic diagnosis, and real-time decision-making processes in health care. In addition, the paper also explores the ways in which technological progress in ML and AI systems and applications can catalyze sustainable health entrepreneurs and provide start-ups the capacity and facility for developing cost-efficient, scaleable, and accessible diagnostic technologies in developing countries. This analysis also identifies the imperative of ML technology in enhancing the viability of a health enterprise and health care system in the Indian context, which can provide Indian health care a pre-emptive and technological future.*

Keywords: Machine Learning; Disease Detection; Bio-Surveillance; Public Health Preparedness; Digital Epidemiology; AI-Based Diagnostics; Cancer Screening; COVID-19 Surveillance; Health Entrepreneurship; Predictive Analytics; India; Sustainable Healthcare Innovation

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