

MACHINE LEARNING FOR PREDICTING COMMUNITY HEALTH RISKS: A CASE STUDY IN PREVENTIVE EPIDEMIOLOGY

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Abstract

This study aims to analyze the role and effectiveness of machine learning in predicting public health risks, focusing on applications in preventive epidemiology. Using a literature review, this study examines various empirical studies, predictive models, and algorithmic approaches that have been used to detect potential outbreaks and disease risk factors at the community level. The review demonstrates that machine learning has significant potential to support public health systems through its large-scale data analysis capabilities, identification of hidden patterns in epidemiological data, and increased accuracy in predicting disease spread. Furthermore, the integration of machine learning with real-time health data enables faster and more targeted preventive intervention planning. However, the study also identified challenges related to data quality, limited digital infrastructure, and ethical and privacy issues in the use of health data. Based on the literature findings, this study confirms that optimizing the application of machine learning in preventive epidemiology requires synergy between technology development, public health policy, and responsible data governance.

Keywords: Machine Learning, Health Risk Prediction, Preventive Epidemiology, Health Data Analysis, Artificial Intelligence.

INTRODUCTION

The development of digital technology in the last decade has had a significant impact on various aspects of human life, including public health. One important breakthrough that has emerged is the use of machine learning (ML) to predict public health risks (Morgenstern et al., 2020). In the context of preventive epidemiology, machine learning functions not only as a data analysis tool but also as an intelligent system capable of identifying hidden patterns, predicting potential disease outbreaks, and providing faster and more precise

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