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Biosensors for Virus and Airborne Pathogen Detection Using Neural Network Optimization Models

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Abstract:

The integration of biosensor technology with neural network optimization models has significantly improved the detection of viruses and airborne pathogens. Neural networks trained on large and diverse datasets enhance the precision of biosensors by reducing false positives and improving sensitivity. Advanced techniques, such as convolutional neural networks (CNNs) combined with generative adversarial networks (GANs), are used to analyse biosensor outputs like surface-enhanced Raman scattering (SERS) spectra, enabling rapid and accurate pathogen identification. Optimization models such as mayfly-optimized CNNs (MOCNN) further enhance signal processing and classification accuracy. These advancements offer real-time, efficient, and scalable solutions for monitoring public health threats in diverse environments.

Keywords: Biosensors, Neural Networks, Virus Detection, Airborne Pathogens, Optimization Models, SERS

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