

Machine Learning-Driven Nanomaterial Design: Predictive Modeling for Enhanced Performance in Electronics

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The integration of machine learning (ML) into nanomaterial design is transforming electronics by enabling predictive modeling for enhanced material properties and device performance. Nanomaterials, with their unique characteristics and extensive applications in semiconductors, batteries, and sensors, hold the key to the next generation of electronic advancements. However, optimizing nanomaterial properties requires navigating a vast parameter space, encompassing atomic composition, structural morphology, and functional characteristics, which conventional experimental approaches alone struggle to manage efficiently. This study leverages advanced ML techniques to address this complexity, offering a powerful framework for predictive material design tailored specifically for high-performance electronics. We propose a novel, data-driven methodology for nanomaterial property prediction, utilizing