Predictive Analysis of Power Generation from Footsteps Using Machine Learning

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Abstract: *Energy has long been the pulse of human civilization, fueling progress and innovation. Yet, as conventional sources dwindle, the search for sustainable alternatives becomes not just a necessity but an inevitability. This project explores a concept hidden in plain sight harnessing the energy of footsteps. Every step carries kinetic potential, an untapped rhythm of daily life waiting to be transformed.*

Piezoelectric tiles embedded in high-footfall areas homes, schools, railway stations capture this overlooked energy, converting motion into electricity. Each step, no longer just a movement, becomes a contribution to a self-sustaining cycle, where human activity fuels itself. But beyond the conversion of energy, intelligence refines its efficiency. Machine learning breathes adaptability into this system. By employing Linear Regression and Random Forest Regression, the technology does not merely generate power it learns. Real-time data analysis predicts and optimizes energy output, creating an evolving system that grows smarter with every footstep. The results unfold on an interactive Python-powered dashboard, where raw motion turns into visualized potential.

In a world that never stands still, where crowded streets and bustling transit hubs define the pulse of modern life, this idea aligns seamlessly with the natural flow of human movement. Especially in a country like India, where millions move in unison every day, the potential is immense. This is more than an experiment in alternative energy it is a vision of sustainability woven into the fabric of urban existence. One step, one spark, one future powered by motion itself.

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