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IoT Enabled Computer-Aided Systems for Smart Buildings

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Editors

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Need of Technological Interventions for Indoor Air Quality and Risk Assessment Upon Short-Term Exposure: A Futuristic Approach



Tahmeena Khan and Alfred J. Lawrence

1 Introduction

Growing population and urbanization have led to environmental deterioration and posed a threat to global air quality [1] and a rise in global temperature [2]. Therefore, it is crucial to create a healthy environment especially indoors where extreme air conditioning is used. Efficient energy management systems for sustainable development and living have become requirements, for instance, Home Energy Management Systems (HEMS) [3]. Short-term variation in pollution and exposure is often neglected, although it has long-term consequences on human health. In the Indian context where the air quality of prominent cities including the National capital Delhi is already deteriorating day by day with the worst particulate (PM_{2.5}) pollution [4] due to vehicular exhaust, industrial emission, waste and stubble burning, construction work as major contributors [5], the pollution load only worsens by episodic events such as Diwali, which is the mega festival of Hindus celebrated at the onset of winters. During the festival, customary firecracker burning takes place and facilitated by the meteorological conditions creates a disaster for the environmental health. Burning of fireworks leads to the release of As, S, Mn, sodium oxalate, potassium perchlorate, sodium nitrite, barium nitrate, Al and Fe dust. Other than this, SO₂, CO₂, CO and suspended particles are also released associated with severe health hazards [6]. Emergency hospital admissions have been associated with the drastic variation in air quality during the Diwali festival and elevated asthma attacks. The risk of mortality from different causes is also associated with short-term exposure to pollutants. Short-term exposure to particulate matter and SO₂ also aggravate

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