Understanding the impact of airborne particles on the environment and human health.

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Introduction

Indoor air quality, a critical concern for human health, is heavily influenced by occupant behavior, but most individuals are unaware of how their daily habits affect their exposure to contaminants. In this research, we attempted to bridge the knowledge gap between a lack of awareness and a comprehension of how occupants' behaviors affect the environment. To that purpose, we conducted a questionnaire survey to assess the IAQ knowledge of 100 families, as well as an investigation of an "eco-feedback" method based on awareness raising activities. In particular, information and experimental campaigns were carried out in ten houses, allowing the success of the program to be assessed in the short term [1]. The findings revealed that the residents are unaware of the IAQ in their homes and their exposure to it. In any case, the eco-feedback technique used was successful in terms of encouraging occupant behavioral adjustments as well as lowering concentration levels while airborne particle producing sources such as cooking were in operation. Indeed, exposure to airborne particles while cooking was lower after the education campaign, with median relative reductions of 47% and 59% for PM10 and particle number concentration, respectively. Because the potential effect of an eco-feedback strategy on interior air quality was demonstrated for the first time, the study's findings could be of significant interest to scientists involved in creating eco-feedback campaigns and indoor airborne particle monitoring [2].

Description

Microplastic particles have been discovered in atmospheric deposition and suspended particulate air samples, which are referred to as 'airborne microplastic' for the purposes of this study. The forms of microplastic particles are often dominated by fibers and fragments, however airborne microplastics could come from a variety of sources [3]. Primary sources are those that have been made *i.e.* purposely added at a micro size for specific purposes, such as exfoliating beads in cosmetics or wastewater filtration. Secondary sources include those created as a result of the breakdown of bigger plastic waste. Airborne microplastics are primarily secondary in origin, but can also be primary and while emissions are unknown, there are a number of hypothesized source sites and activities that contribute to their formation and/or release into the environment [4].

According to certain research, exposure concentrations of airborne particles in subway metro stations might be up to ten times higher than the recommended WHO exposure limit. A few recent studies assessed bio-aerosol exposure in subway environments and found that exposure to bacterial concentrations was up to 44 times higher than the ACGIH (American Conference of Governmental Industrial Hygienists) specified permissible exposure limit and exposure to fungi concentrations was up to 3 times higher than the WHO specified exposure limit. The key contributory cause for bad health effects is the deposition of fine airborne aerosol and bio-aerosol particles in the pulmonary region of the respiratory tract [5].

The many phases of a vehicle's motion idle, acceleration, steady speed and braking all have different effects on wear and friction. In terms of wear, particle waste causes pollution, loss of efficiency, shorter maintenance life and higher vehicle operating expenses. It is estimated that 38% of fuel energy is required in passenger automobiles to overcome friction, which equates to around 200,000 million gallons of fuel every year. The corresponding figures for heavy duty vehicles such as trucks and buses are 33% of fuel energy and 180,000 million gallons required to overcome friction. Surface hardness, the existence of coatings, the pressure between the surfaces and the contact area are all factors that influence the level of wear. The rubbing of two parts can cause frictional losses, creation and degradation.

In recent years, there has been a lot of interest in calculating the total concentration of all harmful metals in the air. Chemical separation of potentially hazardous materials in airborne particles becomes essential. Airborne Particulate Matter (APM), one of the primary and secondary air pollutants, has gained a lot of attention from research communities due to its detrimental effects on human health.

Conclusion

Therefore, information on the size distribution of airborne heavy metals is crucial for determining the global negative health impacts. Deep learning models have recently attracted a lot more attention than mathematical and statistical prediction models. In order to estimate the size fractionated airborne particle bound metals, this study offers a novel Arithmetic Optimisation Algorithm (AOA) using Multi-head Attention Based Bidirectional Long Short Term Memory (MABLSTM) model.

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