Development of sensor restoration and fine dust monitoring techniques based on artificial intelligence Variational convolutional autoencoders

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Reliability of the indoor air quality (IAQ) sensors play an important role in the ventilation system control in subway facilities, influencing over crucial factors as ventilat since faulty sensors may result in misinterpreting the IAQ conditions and mistreating the air delivery rate. Given the IAQ data properties of dynamism, linear and fixed models are not sufficient to extract essential features from the multivariate IAQ data. The intrinsic properties of the data allow a correct process monitoring; thus, the present study introduces a novel IAQ monitoring framework based on variational convolutional autoencoders (VAE-CNN). The VAE-CNN model is trained by utilizing nine IAQ sensor measurements in normal conditions by the variational lower bound (ELBO) maximization. Then,