Optimization of evacuation route for real-time alarm system using machine learning

계혜리, 나종걸[1], 서승권, 이철진†
중앙대학교; [1]Carnegie Mellon University
(cjlee@cau.ac.kr†)

Gas leakage is one of the causes of damage by fire and toxicity. We apply to use the source model to predict the extent of the damage quickly when gas is leaked. However, it has too huge result to predict the damage range, so the prediction method is moved from source model to CFD (Computational Fluid Dynamics) model. But, CFD needs long times to calculate result.
In this study, we use a machine learning model to predict the toxic gas leakage model using CFD, and based on the results, we have established a model that optimizes the minimize escape route in real time. In the case of the machine learning model, VAE-DNN (Variational Autoencoder-Deep Neural Network) model, which shows excellent performance over the gas diffusion damage range, was used and ammonia was selected based on the risk assessment. The training is performed using the CFD model and the accuracy was verified through the test model. Based on this value, the minimize evacuation path optimization is performed according to the moving speed of each time and person.