Consequence modeling for Real-Time Analysis Using Generative Adversarial Networks

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We suggest a way to determine the ragne of damage from high-risk materials. There are many flammable and toxic substances following numerous pipelines in petrochemical complexes. Some consequence modeling are used rigorous equations, but they had low accuracy results. One of modeling methods is Computational Fluid Dynamices(CFD) to calculate release range of various fluids or gases by each scenario. It has high accuracy results, but long time to show result from simulation set.　In this study, we propose variational autoencoder with generative adversarial network (VAE-GAN) for real-time analysis of probability of death. The acrylonitrile is released from underground pipe is main scenario in this study, the result is shown different damage following hole size, mass flowrate and wind condition such as direction or speed. We occur damage result faster than CFD model by data memorization. The proposed model compared mean square error with other models.