

MAE Praxair Seminar

Predicting the evolution of toxic plumes for casualty mitigation in chem-bio incidents

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Filtering techniques to improve the forecast of toxic plumes in chemical and biological incidents will be discussed. The methods are being developed to substantially aid the decision making to reduce human casualties by a better situation assessment in applications such as chemical/biological accidents, warfare or radiological leaks. The objective is data assimilation which is to combine uncertain mathematical model predictions with noisy sensor data to obtain an improved forecast in real time. The dispersion model of the plume is driven by meteorological input. Filtering techniques based on Bayesian approach and Monte Carlo simulations are used to guide the assimilation process which acts as a corrector to the atmospheric dispersion model. The results of implementation of data assimilation methods, using a representative dispersion model, on a simulated chemical incident are presented. Since the problem is very complex it may become computationally intractable, even for today's technology, making the design of data assimilation algorithms very challenging. These data assimilation techniques can be applied to a wide range of inference problems in tracking, weather forecasting, pattern recognition and econometrics.

Bio

Mr. Uma Konda is a PhD student in Mechanical Engineering at UB. He received his Bachelor's degree in Mechanical Engineering from the Indian Institute of Technology - Madras in 2004. He received his MS in Mechanical Engineering from UB in June. His research interests include filtering, control and Bayesian learning.

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Seminar 3:30 pm – 4:30 pm