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FUME: An air quality decision support system for cities based on CEP technology and fuzzy logic*

Enrique Brazález[1], Hermenegilda Macià[1], Gregorio Díaz[1], María_Teresa Baeza_Romero[2], Edelmira Valero[3], and Valentín Valero[1]

[1] Albacete Research Institute of Informatics of Albacete, Universidad de Castilla-La Mancha, Investigación 2, Albacete 02071, Spain
[2] Department of Physical Chemistry, Higher Technical School of Industrial and Aerospace Engineering, Universidad de Castilla-La Mancha, E-45071 Toledo, Spain
[3] Department of Physical Chemistry, Higher Technical School of Industrial Engineering, Universidad de Castilla-La Mancha, E-02071 Albacete, Spain
{Enrique.Brazalez, Hermenegilda.Macia, Gregorio.Diaz, MariaTeresa.Baeza, Edelmira.Valero, Valentin.Valero}@uclm.es

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Abstract. Air pollution has become one of the most important problems in urban areas, and governments are applying regulations in an attempt to fulfill the recommendations of Air Quality (AQ) standards to reduce the pollution. In this paper, we present FUME, a decision support system to process heterogeneous and real-time data to propose daily recommendations following an action protocol based on AQ standards. This approach considers past, current and future environmental situations (AQ and atmospheric stability). FUME is implemented by combining Fuzzy Logic (FL) and Complex Event Processing (CEP) technology. In particular, we propose a Fuzzy Inference System (FIS) to improve the decision-making process by recommending the actions for four different sources of pollution: traffic, industry, domestic and agriculture. The FUME approach is applied to a specific case study: the city of Puertollano (Ciudad Real, Spain), where the pollution levels of PM10 are, on numerous occasions, above the World Health Organization (WHO) recommendations.

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