

# Real-time Context-Aware Detection in Collaborative Internet of Things

Guadalupe Ortiz<sup>1</sup>, Juan Boubeta-Puig<sup>1</sup>, Alfonso García-de-Prado<sup>1</sup> and David Corral-Plaza<sup>2</sup>

<sup>1</sup> UCASE Software Engineering Research Group, University of Cádiz

<sup>1,2</sup> School of Engineering, Avda. de la Universidad de Cádiz, 10, 11519 Puerto Real, Spain  
{guadalupe.ortiz, juan.boubeta, alfonso.garciadeprado, david.corral}@uca.es

## Position Statement

Society has numerous methods for production and exchange of huge amounts of data originated in smart Internet of Things (IoT) devices. Such growing data sources require the use of methodologies and tools different from conventional ones in order to fast profit from the relevant information obtained according to a particular context.

We have proposed the use of Event-Driven Service-Oriented Architectures (SOA 2.0) in conjunction with Complex Event Processing (CEP) in several domains to solve the mentioned issue. In particular, we proposed CARED-SOA [1], a Context-AwaRE Event-Driven Service Oriented Architecture which provides context awareness in the scope of IoT. It collects data from heterogeneous sources and facilitates communications between agents as well as user notification of relevant detected situations. Afterwards, we also presented COLLECT [3]: a COLlaborative ConText-aware service oriented architecture for the IoT, which facilitates real-time context spreading along the architecture nodes and the ability to infer more meaningful knowledge from real-time correlation of heterogeneous domains and context data through distributed CEP.

Besides, we have also presented an outstanding tool, MEdit4CEP [4], a model-driven solution for graphical modeling of CEP domains, patterns and subsequent actions to be performed. Event pattern models are automatically validated and transformed into code, which is automatically deployed at runtime. Even more, the editor allows modeling event patterns regardless of their implementation: every pattern is graphically designed once and it can then be automatically transformed into any specific EPL code. We have extended MEdit4CEP with PCPN [5], which together with CPNTools, makes possible the simulation, analysis and semantic validation of the situations to be detected in a CEP-based system for a particular application domain.

Note that even though we have applied our tools and architectures in several domains we have particularly worked in the scope of smart health, mainly related to preventing health risks derived from unsuitable air quality conditions.

Main open future lines focus on (1) facilitating the integration of additional sources and contexts, and creating semantic and syntactic connectors for our system architecture; (2) extending real-time detection mechanisms to prediction ones; (3) extending MEdit4CEP for additional input sources and output actions and platforms.

## References

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