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V. Urovi[a,*], O. J. del Toro[b], F. Dubosson[b], A. R. Torres[c], M. I. Schumacher[b]

[a] *Accounting and Information Management, University of Maastricht, Netherlands*
[b] *Institute of Information Systems, University of Applied Sciences of Western Switzerland*
[c] *IL3-Micromat Institute, Barcelona University, Spain*

Abstract

This paper describes a novel temporal logic-based framework for reasoning with continuous data collected from wearable sensors. The work is motivated by the Metabolic Syndrome, a cluster of conditions which are linked to obesity and unhealthy lifestyle. We assume that, by interpreting the physiological parameters of continuous monitoring, we can identify which patients have a higher risk of Metabolic Syndrome. We define temporal patterns for reasoning with continuous data and specify the coordination mechanisms for combining different sets of clinical guidelines that relate to this condition. The proposed solution is tested with data provided by twenty subjects, which used sensors for four days of continuous monitoring. The results are compared to the gold standard. The novelty of the framework stands in extending a temporal logic formalism, namely the Event Calculus, with temporal patterns. These patterns are helpful to specify the rules for reasoning with continuous data and in combining new knowledge into one consistent outcome that is tailored to the patient's profile. The overall approach opens new possibilities for delivering patient-tailored interventions and educational material before the patients present the symptoms of the disease.

Keywords:
Temporal Reasoning, COMPOSE, Metabolic Syndrome, Event Calculus.

*Principal Corresponding author
Email address: v.urovi@maastrichtuniversity.nl (V. Urovi)