Objects and Events in Context

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1 Introduction

“Smiles, walks, dances, weddings, explosions, hiccups, hand-waves, arrivals and departures, births and deaths, thunder and lightning: the variety of the world seems to lie not only in the assortment of its ordinary citizens... but also in the sort of things that happen to or are performed by them” [3]. This variety is also evident in our conceptualizations of reality, with, on one hand, “processes”, “activities”, “tasks”, “events”, “occurrences”, “incidents” unfolding in time, and, on the other hand, “objects”, “actors” and “resources” persisting through time, possibly changing in a qualitative way while maintaining their identity.

The distinction between these categories is commonplace in philosophical literature, with the former broadly referred to as “events” (or *perdurants*) and the latter broadly referred to as “objects” (or *endurants*) [3,8]. In this spirit, I here use the term “event” broadly, including references to atomic transitions, complex processes, and even “stative occurrences” (e.g., “Mary sitting in a bench for an hour”) [6]. Analogously, I use the term “object” to refer to independent entities or *substantials* (e.g., you and me, Italy, the moon, John’s car), as well as parasitic “object-like” entities such as *qualities* (e.g., the objectified color of that rose; Sofia’s beauty), *dispositions* (e.g., Matteo’s capacity of speaking Portuguese), and *relationships* (e.g., the marriage of John and Mary, Linda’s presidential mandate) [8,11,6].

In existing modeling frameworks in computer science and related areas, the distinction between *behavioral elements* and *structural elements* (“how” versus “what”) is often invoked to account for the different nature of elements belonging to these two broad ontological categories [16,12]. Accordingly, different modeling disciplines have been established to deal with behavioral and structural modeling, each of which with a different focus. For example, the business process modeling discipline focuses on the “event-like entities”, and, in contrast, the (structural) conceptual modeling discipline focuses on “object-like entities”. In each of these disciplines, entities of one of these ontological categories are first-class citizens, while the other category plays a marginal role (if any). Some notable exceptions in the process discipline are the so-called business artifact-centric approaches [13,14], and in the structural conceptual modeling discipline, the event reification approach [15]. In this talk, I argue that there are many
complex domains (e.g., economics and finance, life sciences, defense, advanced engineering) and application areas (e.g., early warning systems, context-aware computing) that require a fuller modeling approach able to capture subtle aspects of objects and events, as well as the multiple relations involving them [6][9]. Moreover, I argue that such an approach should be based on an in-depth ontological analysis of the nature of these entities. In particular, a notion that deserves the conceptual clarification afforded by such an ontological analysis is that of context.

From an object perspective, we seldom interact with these entities qua-themselves, but we frequently conceive objects qua-playing-certain-roles in given “contexts” [7]. For example, most of our interactions with other human beings and, hence, our conceptualizations of these interactions are thought in terms of roles such as parent, employee, student, president, citizen, customer, etc. Analogously, when thinking about, for instance, cars, we think about them as means of transportation, insurable items, work-related resources, product offerings, etc. Moreover, we often conceive these “contexts” as relational ones [7,6]: marriages, employments, enrollments, and presidential mandates are themselves concrete “object-like” entities that define a scope in which ordinary objects play complementary roles interacting with each other. Furthermore, these relational entities are constituted by other dependent “object-like” entities (qualities and dispositions) [5] that delimit the properties (e.g., commitments, claims, capacities, powers) that ordinary objects can exhibit in the scope of a given role.

From a behavioral perspective events themselves can also be framed in certain “contexts”. In the most obvious way, this refers to complex events of which more basic events can be part (e.g., “that talk happened in the context of that conference”) [11]. Moreover, “event contexts” can also refer to certain scenes [6] (e.g., a lunch meeting in the presence of a number of other happenings in a restaurant), and situations [1] (e.g., “Martin Luther Kind marching while Lyndon Johnson was the president of the U.S.A.”). Finally, there are entities that, while not mereologically related a particular event, do directly influence its manifestation (e.g., “the rain falling during a football match”, “the turbulence during a flight”, “the headache during a meeting”), thus, in a sense, “contextualizing” that event.

In this talk, I also discuss the ontological nature of a number of these entities including substantials, qualities, dispositions, relationships, events, roles, and scenes. This is done in light of the Unified Foundational Ontology (UFO) [8][10][11]. In doing that, I propose some (non-exhaustive) interpretations for the overloaded term “context” when applied to ordinary objects and events dealt with by conceptual modeling, I then discuss the impact of the behavioral vs. structural divide in that field. Finally, I demonstrate how an ontological analysis and conceptual clarification of the nature of these entities can provide the foundations for a fuller conceptual modeling approach, needed for modeling complex domains [9][2].
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References