Today’s software applications increasingly feature a great deal of openness, dynamism and unpredictable behavior, forcing to shift design and engineering from traditional, centralized approaches to nature-inspired, self-organizing techniques. Among the others, biology has been adopted as a source of inspiration to solve some of the issues proper of nowadays systems by self-organizing techniques, usually exploited in an ad-hoc way. As a result, little or no effort has been made to clearly describe and classify these techniques in terms of design patterns, preventing them from being systematically applied to solve recurrent problems. Correspondingly, this paper is targeted at modeling bio-inspired mechanisms in terms of design patterns, arguing that some fundamental biological behavior can play the role of basic design patterns to define higher-level patterns featuring more complex behavior and interaction. In this way, we aim at easing both the creation of new mechanisms from adaptation of existing ones, and the classification of the biological behaviors underlying each pattern. The viability of this approach is exemplified through the description of two bio-inspired mechanisms, aggregation and spreading, taken as basic design patterns to define gossip as a composite design pattern.
[1] https://www.iiia.csic.es/en/staff/jos%C3%A9-luis-fern%C3%A1ndez