Editorial Preface

Technological Ecosystems for Enhancing the Interoperability and Data Flows

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A technological ecosystem is a metaphor to express a needed evolution of the traditional information systems (García-Peñalvo, 2016). These are solutions based on the composition of different software components and services that share a set of semantically defined data flows. The result is a complex ecosystem that provides a set of services that each component separately does not offer and is able to evolve as a whole in a better way when its components does or when some components are dropped out or when new components are included. Moreover, the technological ecosystem is thought to offer a better user experience in the way that users are also part or components of the ecosystem.

The internal structure of the technological ecosystems is more complex than a traditional information system (García-Holgado & García-Peñalvo, 2017a, 2017b), this implies that these solutions should be taken into account in those cases in which the knowledge management (Fidalgo-Blanco, Sein-Echaluce, & García-Peñalvo, 2014, 2015) and solution-making processes are based on heterogeneous and complex data-driven architectures (García-Peñalvo et al., 2015).

The technological ecosystem metaphor comes from the Biology field and it has been transferred into software development because it reflects so well the evolutionary nature of software. There are several authors that use the definition of natural ecosystem to support their own technological ecosystem definition systems (Chen & Chang, 2007; Dhungana, Groher, Schludermann, & Biffl, 2010; Mens, Claes, Grosjean, & Serebrenik, 2014; Yu & Deng, 2011). This way, a technological ecosystem may be defined through a mapping with the main elements that appear in every natural ecosystem (García-Holgado & García-Peñalvo, 2014, 2016), i.e., the organisms or biotic factors, the physical environment in which they inhabit or abiotic factors and the relationships between organisms and organisms with the environment. Specifically, within a technological ecosystem there are a set of persons and software components that represent the role of the biotic factors; a set of elements that allow that ecosystem runs (hardware, communications, etc.), these are the abiotic factors; and a set of data flows that mean the relationships among the software components and among these components and the involved users.

There are different kinds of technological ecosystems:

- **Product-line based ecosystems:** Defined around a product or a brand, for example, iOS or Android product-lines ecosystems. These ecosystems have a more transversal orientation;
- **Domain ecosystems:** Oriented to offer services related to a specific domain, such as education (García-Peñalvo et al., 2017), public administration (García-Holgado, Cruz-Benito, & García-Peñalvo, 2015), competences recognition (García-Peñalvo et al., 2013; García-Peñalvo, Johnson, Ribeiro Alves, Minovic, & Conde-González, 2014; García-Peñalvo et al., 2012), observatories (Vázquez-Ingelmo, Cruz-Benito, & García-Peñalvo, 2017), etc.;

- **Open source based ecosystems:** Mainly are composed by open source components (García-Peñalvo & García-Holgado, 2017).

The main characteristics of a technological ecosystem are (García-Holgado & García-Peñalvo, 2013):

- Solid methodological and project and risks management base;
- Definition of the necessary processes and workflows to manage the ecosystem;
- Centralized management of users, both data and authentication throughout the ecosystem;
- Centralized management of data flows, so they can be used in different system components;
- Integration of the components in a transparent way, to ensure the flexibility and adaptability of the system against the changes, that is to say, there must be a plan to assure the evolution of the ecosystem;
- Reuse of ecosystem components;
- Integration at the presentation level so the user is aware that it is within the ecosystem;
- Strong social component that allows integration with social tools;
- Support for decision-making and for the analysis of the information flows that take place both within the ecosystem and from abroad and vice versa;
- Improvement of the user experience in the way users are part of the ecosystem.

JITR is interested in technological ecosystem models, developments, cases, etc., that express the complex way to manage data and knowledge.

This JITR issue is comprises ten research papers.

Almudena Mangas et al. (2018) analyze the factors that may influence the results of a systematic literature review (SLR) (Kitchenham, 2004) in Social Sciences and Humanities.

Ismar Frango Silveira and Klinge Villalba Condori (2018) present an open perspective on the development of educational games, emphasizing the challenges related to their development and their effective potential for use in education, proposing that they be designed as Open Educational Resources (OER) (UNESCO, 2012). The Open Access movement research is encouraged by JITR editorial policy (García-Peñalvo, 2017).

Boumaza and Maamri (2018) investigate the mapping of OWL-S process model to Timed automata, a suitable formalism for real time systems modeling and automatic verification. Hence, they not only enable automatic verification but also cover problems related to automated verification of temporal quantitative properties as bounded liveness property, so far not tackled.

Aparna Vegendla et al. (2018) present a mapping study on the issues of requirements engineering and quality aspects in software ecosystems. The findings indicate that among the various phases or subtasks of requirements engineering, most of the software ecosystems specific research has been accomplished on elicitation, analysis, and modeling. On the other hand, requirements selection, prioritization, verification, and traceability have attracted few published studies.

Enrique Rubio et al. (2018) propose the conceptual model of the ‘Web Knowledge Turbine’ (WKT) as a self-organized ecosystem for the co-creation of personal and collective narratives. From the perspective of complexity, authors contemplate all human social systems as Complex Adaptive Systems with the capacity for self-organization derived from a permanent learning process.

Singh and Chhabra (2018) propose a framework to combine OC-LBP and HOG for selection and implementation of a face descriptor.

Sophia Alim (2018) makes a study that extracted and analyzed 2,854 tweets associated with congenital heart disease. The results highlighted that the presence of a higher number of URLs, hashtags or followers did not lead to a high number of retweets. Content analysis was carried out on 250 randomly selected tweets from the sample. Analysis of tweet content found that information was shared rather than being sought, with content sharing being the most popular style of tweet. This highlighted the power of Twitter in offering access to support to congenital heart disease suffers and families via an online platform.

S. Charles Britto and S. P. Victor (2018) present a polarity based root cause identification technique that identifies the root cause of a query presented by the user. The query is presented to all the available data sources, and the information returned is filtered using conflict resolution techniques. The data is then subjected to fuzzy polarity analyzer that divides the data into groups based on their polarity levels. The data is then cross referenced with the domain based ontology to identify the root cause.

D. Dubey and R. B. Mishra (2018) have applied cognition on robot using Q-learning based situation operator model. The situation operator model takes the initial situation of the mobile robot and applies a set of operators in order to move the robot to the destination. The results obtained by the proposed method were compared to the result obtained by Reinforcement Based Artificial Neural Network for path planning.

The last paper by R. R. Sahoo and M. Ray (2018) make a systematic review on several meta heuristic techniques like Genetic Algorithm, Particle Swarm optimization, Ant Colony Optimization, Bee Colony optimization, Cuckoo Search, Tabu Search and some modified version of these algorithms used for test case generation.

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