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Software Development Process Mining

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Abstract

Software development has become a fundamental process on any business or organization. As a consequence, together with other emergent technologies, in addition to traditional development environments, new development platforms are being created, mainly in the cloud requiring different approaches on the way software development can be studied. Traditionally, software evolution studies use data insights from software configuration management repositories (SCM), source code systems (SC) and bug tracking (BT) tools. Many times those works focus on SCM, SC and BT synergies but they do not include metadata collected from the development environments (IDEs) about user activities. Information about developer behaviour and IDE usage can be identified as a missing perspective and a fundamental dimension to be part in the area of software development. The discovery of patterns when coding, the search for programmer behaviours and deviations from expected processes to follow, sustain this work.

We expect to produce contributions across three areas of software process mining: model discovery, conformance checking and process enhancement. Model discovery aims at discovering a software process model or at least some software process patterns by mining event logs taken from real software development activities. Conformance checking stands for diagnosing if actual software development activities (again captured as event logs) are following a pre-specified model. Finally, process enhancement aims at improving an existing software process model with information extracted from actual software process instances, captured from event logs during the various activities of the software development process.

Based on the mentioned mining techniques, we expect to analyse the order of activities in development, highlight resources, such as people, projects, roles, and how they are related and potentially predict process time, discover bottlenecks, track resource utilization and measure service levels. In addition, from a Socio-Technical perspective, we expect to identify bad and good practices amongst the developers and profile them using clustering analysis or other classification techniques. As an overall result we expect to contribute to make IDEs more adaptable to the user by identifying different developer profiles, detecting the most used features and actions done in IDEs and potentially by suggesting advices to the developers.

References

João Caldeira, Fernando Brito e Abreu, "Software Development Process Mining: Discovery, Conformance Checking and Enhancement", 2016 10th International Conference on the Quality of Information and Communications Technology (QUATIC), vol. 00, no. , pp. 254-259, 2016, doi:10.1109/QUATIC.2016.061

Transdisciplinary vision of digital architecture through computational methods of mapping, analysis and visualization

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Abstract

Architectural practice is changing not only with computers but also with the use of other disciplines. It is important to establish how architecture started to change. This research aims to draw a historic perspective of transdisciplinary digital architecture through the work of key personalities by establishing links between them and their relevance to nowadays architecture.

It is possible that the change of mind in architecture goes beyond the digital revolution and that architectural practice is becoming fully transdisciplinary besides digital. At the second decade of the 21st century, an architect may have the requirement to use any digital architecture and to deal with algorithms, parametrics and topology and likewise concepts from science and technology (Kolarevic, 2004; Doucet and Janssens, 2011).

Architecture in the last hundred years has undergone a big change but this transformation maybe has not started with early digital computers from early sixties. Nowadays digital architecture can be tracked back to the groundbreaking work of Ivan Sutherland and his 1963 PhD thesis Sketchpad at MIT. This was the first CAD system to be known and even contemplating other pioneer work, this can be considered an inception point for digital architecture (Sutherland, 1963).

But before the digital change of architecture, the transdisciplinary change came first. The transdisciplinary change in architectural has started 40 years early with new teaching methods at Bauhaus with teachers like Gropius and Moholy-Nagy who teach architecture with a new machine-based method. Bauhaus can be considered an important starting point to transdisciplinary architecture like Sketchpad can be to digital architecture. And If nowadays architecture is both digital and transdisciplinary, it is important to trace the relevance of transdisciplinary change as well as the digital change (Moholy-Nagy, 1947; Sutherland, 1963; Gropius, 1965).

Transdisciplinary Digital Architecture has an essential background needed to be known. Bauhaus faculty and other architectural teachers emigrated first to the UK and after to the United States. This made possible that transdisciplinary ideas could flourish on both sides of the Atlantic (Rocha, 2004; Picon, 2010). This research main contribution is to extend the literature, seeking to establish the connection between the use of the machine in architectural teaching and the evolution to computer use in architecture, tracing links between the key figures and between the early computer graphics research and nowadays transdisciplinary digital architecture.

The research methodology aims to trace the evolution of architecture from Bauhaus to Sketchpad and from there to nowadays transdisciplinary digital architecture. It will be focused on relationships and interactions between people, places, and institutions, using computational methods of mapping, analysis and visualization. The study will be grounded not only on archival and oral historical research but also on alphanumeric and spatial databases. We expect to find many connections and influences between a group of architectural teachers which will allow us to establish a path, along almost a century, towards the 21st century architecture.

References

- Doucet, I. and Janssens, N. (2011) *Transdisciplinary knowledge production in architecture and urbanism: Towards Hybrid Modes of Inquiry*. Springer Science & Business Media.
- Gropius, W. (1965) *The new architecture and the Bauhaus*. MIT Press.
- Kolarevic, B. (2004) *Architecture in the digital age: design and manufacturing*. Taylor & Francis.