A Systematic Review of Metamodelling in Software Engineering

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Abstract Metamodelling has become a crucial technique to handle the complexity issues in the software development industry. This paper critically reviews and systematically classifies the recent metamodelling approaches to show their current status, limitations, and future trends. This systematic review retrieved and analyzed a total of 1157 research studies published on the topic of metamodelling. The retrieved studies were then critically examined to meet the inclusion and exclusion criteria, in which 69 studies were finally nominated for further critical analysis. The results showed that the main application domains of metamodelling are the cyber-physical and safety-critical systems development. Moreover, the majority of used approaches include metamodels formalization, adding spatial and time semantics, and considering nonfunctional properties. Further, the main trends of metamodelling development include the support of complex systems, behavior modeling, and multilevel modeling. The results of this systematic review would provide insights for scholars and software engineering practitioners looking into the state-of-the-art of metamodelling and assist them in improving their approaches.

Keywords Metamodelling · Software engineering · Systematic review

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