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The increasing complexity in robotics intelligent systems

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In the last 15 years, Honda Research Institute Europe invested a substantial effort in understanding and experimenting how software development integration environments play a role in designing and developing complex, parallel, real-time and intelligent robotics systems. Our investigation encompasses methodologies, processes, software frameworks, functionalities, technical implementation and the actual coding process. The result shows that a holistic approach to this topic is rather necessary if a high level of performance and complexity has to be managed. A lot of different solutions emerged in the last decades in the software and more recently, in the robotics domain. Commercial companies, consortiums, university and private initiatives tackled the problem of managing complexity in apparently different but often very similar ways. Proposed solutions tackle the problem from different perspectives, focusing on a particular aspect, each time, considering it more important than the others. This leads to a zoo of different implementations of the same concept in different flavors namely a software integration environment for managing system development complexity. In this talk, we will review the different strategies in an incremental way (from simple to more advance). Along that line, we will be able to recall the existing solutions, identifying their strength and weaknesses. We may clearly state that model driven development, component based software engineering are the leading paradigms used in this zoo, together with supports for parallelization and communication in networked environments. If 15 years ago, the robotic community was mostly against such software frameworks, nowadays the landscape changed completely.

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