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## Data Mining applied to Robotics

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One of the key activities of Data Mining is to discover and make clear hidden relations and working rules in complex systems. Robotics is a complex scope in which first principles approaches have been used to solve straight problems, but that approach is not enough to deal with complex problems, where more intelligence-based approaches are needed. Data Mining can be used for autonomous learning of control algorithms for Linked Multicomponent Robotic Systems (L-MCRS), because it is an open research field. Single Robot Hose Transport (SRHT) is a limit case of this kind of systems, when one robot moves the tip of a hose to a desired position, while the other hose extreme is attached to a source position. Reinforcement Learning (RL) algorithms have been applied to learn autonomously the robot control in SRHT, specifically Q-Learning and TRQ-Learning have been applied with success. However storing the state-action value functional information in tabular form produces large and intractable data structures, and using the Data Mining approach the problem can be addressed by discovering and learning the state-action values of Q-table by Extreme Learning Machines (ELM), obtaining a data reduction because the number of ELM parameters is much less than the Q-table's size. Moreover, ELM implements a continuous map which can produce compact representations of the Q-table, and generalizations to increased space resolution and unknown situations.

### Biography

Jose Manuel Lopez-Guede received the Ph.D. degree in Computer Sciences from Basque Country University. He got 3 investigation grants and worked in a company 4 years. Since 2004 he worked as full time Lecturer and since 2012 as assoc. prof. He has been involved in 24 competitive projects and published more than 100 papers, 25 on Educational Innovation and the remaining in specific research areas. He has 20 ISI JCR publications, more than 15 other journals and more than 40 conferences. He has belonged to more than 10 organizing committees of international conferences and to more than 15 scientific committees.

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