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CORBA-Based Communications Architectures for Resource Holons in HMS

Gabriela Varvara



[Full text](#)

The Holonic Manufacturing Systems (HMS) represent a pragmatic solution to model and design modern production processes intended to be flexible in terms of to the volume and the diversity of the resulting consumer goods and adaptable to the availability of the processing resources. In order to increase the efficiency of HMS, the communication aspects like interoperability and reliability inside a genuine distributed system have to be carefully considered. This paper details the design aspects of a distributed service-oriented architecture based on CORBA standards intended to enhance the cooperation during the holarchies formation in a PROSA based architecture. It presents the communication architectural view and the basic rules to define the IDL generic interfaces and a client-server Java application that integrates a control system developed in JACK[®] multiagent environment for the resource holons.

Key words: CORBA, distributed programming, communication architecture, network robotics, holonic control

2000 Mathematics Subject Classification: 68T42, 93C95

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Intelligent Agent Planning with Quasi-Determined States Using Inductive Learning

Florin Leon



[Full text](#)

Traditional representations for planning problems use predicative logic, and many planning algorithms consider the environment to be deterministic and the planning agent to be detached from its execution environment. Also, reactive agent architectures have been proposed that address the problem of quick responses to changes in the environment, and consider the intelligent behavior of an agent to be an emergent result of the interaction of simpler, layered behaviors. However, these approaches do not take into account learning as an intrinsic part of problem-solving or planning behavior. In this paper, we describe a method of including a learning phase into the plan itself, so that the agent can dynamically recognize the preconditions of an action when the states are not fully determined, and even directly choose its actions based on learning results.

Key words: intelligent agents, planning, inductive learning, classification

2000 Mathematics Subject Classification: 68T20, 68T42

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An E-Mail Filtering Agent Based on Support Vector Machines

Constantin Lazurcă and Florin Leon



[Full text](#)

E-mail filtering has recently become an important issue due to the increasing popularity of the electronic mail communication. Therefore, there is a constant need to improve the detection of unsolicited messages, or spam. Many researchers have applied machine learning techniques for filtering spam messages, and they were proven to be successful. In this paper we present a spam detection agent based on support vector machines (SVM), one of the best classification methods available today. We test several methods of extracting numerical features from text documents, and assess the optimal values of SVM parameters needed for this classification problem. The best results show a very good classification accuracy of 94%.

Key words: e-mail filtering agent, support vector machines, classification

2000 Mathematics Subject Classification: 68T50, 68T42

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Self-Adaptable Security Architecture for Power-Aware Embedded Systems

Nicolae Alexandru Botezatu, Vasile Ion Manta and Andrei Stan



[Full text](#)

Securing embedded systems is a challenging and important research topic due to limited computational and memory resources. Moreover, battery powered embedded systems introduce power constraints that make the problem of deploying security more difficult. This problem may be addressed by optimizing the trade-off between minimizing energy consumption and maintaining a proper security level. This paper proposes a self-adaptable security architecture for embedded systems. The proposed method points out a conceptual blueprint needed for the implementation of such self-adaptable mechanisms. An example case study is described in order to better understand how an adaptable security mechanism can be implemented, also pointing out the effect on energy consumption.

Key words: embedded systems, power constrains, energy consumption, security

2000 Mathematics Subject Classification: 68M01, 94C99

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Architectural Support for Subroutine Execution Time Monitoring in Embedded Microprocessors

Andrei Stan, Radu Ciorap and Florina Ungureanu



[Full text](#)

Many embedded systems are used to implement safety critical applications that have to satisfy real time requirements. The real time requirements are derived from the functional characteristics of the physical system controlled by the application. In these systems, the correct operation as a whole depends also on the timeliness of the results. Results that are available earlier or later than a specified time, although they may be logically correct, they may cause unpredictable system behavior because of the timeliness violation. This paper presents the design of a digital module (watchdog) that may be included in embedded microprocessors in order to provide a mean to detect and signal the violation of timing characteristics of the executing code. The timing behavior monitoring is performed by measuring the execution time of subroutines and comparing the results with reference values. The proposed module does not require any modification of the monitored embedded microprocessor architecture. The module may be also used in non real time systems to implement security checking mechanisms by detecting various abnormal operating conditions that alter the execution time of subroutines (e.g. insertion of malicious/virus code).

Key words: embedded systems, microprocessor architecture, security, watchdog.

2000 Mathematics Subject Classification: 68M01, 93C62

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Motion Planning and Control of a Car-Like Robot in an Environment Cluttered With Static Obstacles

Narcis Ghita and Marius Kloetzer



[Full text](#)

This paper proposes a method for planning and controlling the motion of a car-like robot such that, by starting from a given initial position, a goal position is reached in an environment cluttered with static obstacles. The outcome of the planning part is an implementable trajectory guaranteeing a collision-free movement, and the control part consists from a trajectory following technique. The planning part iterates three main steps: first, an angular path linking the initial and the final position is found by using a cell decomposition of the environment. Second, a smooth trajectory satisfying the curvature constraints of the car is obtained. Third, we develop a procedure that takes into account the size of the car and tests if the smooth trajectory is feasible from the point of view of avoiding collisions with obstacles. The developed approach is supported by illustrative examples that use different cell decompositions.

Key words: motion planning, car-like robot, cell decomposition, path following

2000 Mathematics Subject Classification: 93C85, 70E60

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On Resource Service Access in a Holonic Manufacturing System

Doru Pănescu and Carlos Pascal



[Full text](#)

This paper treats some problems concerning the access to the resources when the holonic approach is used in manufacturing systems. The proposed solution makes use of a separate component that should solve distinct problems on accessing the services provided by the operational units existing in a manufacturing environment. It solves the configuration phase and then ensures the information collecting as needed for system monitoring and evaluation. The interfaces integrated with the respective component are described, too. For the holonic architecture performance analysis, a Petri net based model is used. The conclusions regard the way a centralized component added to a heterarchical manufacturing control scheme can determine certain advantages.

Key words: holonic manufacturing system, configuration, resource access, Petri nets.

2000 Mathematics Subject Classification: 68T42, 93C5; 93C65

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