Chapter 1 : Dynamic Probabilistic Systems, Volume II: Semi-Markov and Decision Processes

Dynamic Probabilistic Systems, Volume I: Markov Models: 1 and millions of other books are available for Amazon Kindle. Learn more Enter your mobile number or email address below and we'll send you a link to download the free Kindle App.

SPNP allows the modeling of complex system behaviors. Advanced constructs are available, such as marking dependent arc multiplicities, enabling functions, arrays of places or transitions, and subnets; in addition, the full expres Advanced constructs are available, such as marking dependent arc multiplicities, enabling functions, arrays of places or transitions, and subnets; in addition, the full expressive power of the C programming language is available to increase the flexibility of the net description. Show Context Citation Context Markov reward processes have the potential to reflect concurrency, contention, faulttolerance, and degradable performance; they can be Eval , " We present a decomposition approach for the solution of large stochastic reward nets SRNs based on the concept of near-independence. The overall model consists of a set of submodels whose interactions are described by an import graph. Each node of the graph corresponds to a parametric SRN submodel Each node of the graph corresponds to a parametric SRN submodel and an arc from submodel A to submodel B corresponds to a parameter value that B must receive from A. The quantities exchanged between submodels are based on only three primitives. The import graph normally contains cycles, so the solution method is based on fixed point iteration. Any SRN containing one or more of the nearly-independent structures we present, commonly encountered in practice, can be analyzed using our approach. No other restriction on the SRN is required. We apply our technique to the analysis of a flexible manufacturing system. Our definition of SRN explicitly includes parameters inputs and the specification of multiple measures outputs. Comp , " We present new algorithms for the solution of large structured Markov models whose infinitesimal generator can be expressed as a Kronecker expression of sparse matrices. We then compare them with the shuffle-based method commonly used in this context and show how our new algorithms can be advantageo We then compare them with the shuffle-based method commonly used in this context and show how our new algorithms can be advantageous in dealing with very sparse matrices and in supporting both Jacobi-style and Gauss-Seidel-style methods with appropriate multiplication algorithms. The complexity of our algorithms is compared under different sparsity assumptions. A nontrivial example is studied to illustrate the complexity of the implemented algorithms. Continuous time Markov chains CTMCs are an established technique to analyze the performance, reliability, or performability of dynamic systems from a wide range of application areas. CTMCs are usually specied in a high-level modeling formalism, then a software tool is employed to generate the state space and generator matrix of the underlying CTMC and compute the stationary Show Context Citation Context Although the mapping of a high-level model onto the CTMC and the computation of the stationary distribution are conceptually simple, practical problems arise due to the enormous size of CTMCs model Fluid stochastic Petri nets augmented with flush-out arcs: Bobbio - Discrete Event Dynamic Systems, 11 1 , " Fluid or Hybrid Petri Nets are Petri net based models with two classes of places: With respect to previous formulations, the FSPN With respect to previous formulations, the FSPN model presented in this paper, is augmented with a new primitive, called flush-out arc. A flush-out arc connects a fluid place to a timed transition, and has the effect of instantaneously emptying the fluid place when the transition fires. The paper discusses the modeling power of the augmented formalism, and shows how the dynamics of the underlying stochastic process can be analytically described by a set of integro-differential equations. A procedure is presented to automatically derive the solution equations from the model specifications. The whole methodology is illustrated by means of various examples. Sanders , " We prove that the optimal lumping quotient of a finite Markov chain can be constructd in O m lg n time, where n is the number of states and m is the number of transitions. The proof relies on the use of splay trees [18] to sort transition weights. Stochastic process algebras such as PEPA provide ample support for the component-based construction of models. Tools compute the numerical solution of these models; however, the stochastic process algebra methodology lacks support for the specification and calculation of complex performanc Tools

compute the numerical solution of these models; however, the stochastic process algebra methodology lacks support for the specification and calculation of complex performance measures. This paper addresses that problem by presenting a performance specification language which supports high level reasoning about PEPA models, allowing the description of equilibrium steady-state measures. The meaning of the specification language can be made formal by examining its foundations in a stochastic modal logic. A case-study is presented to illustrate the approach. This third manual is an updated version of manuals previously published as Dina Notat No.

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The first volume treats the basic Markov process and its variants; the second, semi-Markov and decision processes. Its intent is to equip readers to formulate, analyze, and evaluate simple and advanced Markov models of systems, ranging from genetics and space engineering to marketing.

Probabilistic Self-Stabilization by Ted Herman , " A probabilistic self-stabilizing algorithm for a ring of identical processes is presented; the number of processes in the ring is odd, the processes operate synchronously, and communication is unidirectional in the ring. The normal function of the algorithm is to circulate a single token in the ring The normal function of the algorithm is to circulate a single token in the ring. If the initial state of the ring is abnormal, i. Distributed Computing, Probabilistic Algorithms, SelfStabilization, Uniform Rings 0 Introduction A self-stabilizing algorithm for a ring of identical processes is required; the algorithm is to circulate exactly one token in the ring: The solution presented in this paper is simple, inviting an informal example. The performance of individual agents in a group depends critically on the quality of information available to it about local and global goals and resources. In general it is assumed that the more accurate and up-to-date the available information, the better is the expected performance of the individ In general it is assumed that the more accurate and up-to-date the available information, the better is the expected performance of the individual and the group. This conclusion can be challenged in a number of scenarios. We investigate the use of limited information by agents in choosing between one of several different options, and conclude that if agents are deliberately kept ignorant about any number of options, the entire group can converge faster to a stable and optimal configuration. We also demonstrate how a couple of coalition formation schemes improves the rate of convergence and conclude that a variable, rather than fixed, coalition formation mechanism is more effective. Introduction In a distributed multiagent environment the behavior of a group of agents is measured in terms of the performance of agents and the utili Halpern - In Proc. The study of belief change has been an active area in philosophyand AI. In recent years, two special cases of belief change, belief revision and belief update, have been studied in detail. Roughly speaking, revision treats a surprising observation as a sign that previous beliefs were wrong, while up Roughly speaking, revision treats a surprising observation as a sign that previous beliefs were wrong, while update treats a surprising observation as an indication that the world has changed. In general, we would expect that an agent making an observation may both want to revise some earlier beliefs and assume that some change has occurred in the world. We define a novel approach to belief change that allows us to do this, by applying ideas from probability theory in a qualitative settings. The key idea is to use a qualitative Markov assumption, which says that state transitions are independent. We show that a recent approach to modeling qualitative uncertainty using plausibility measures allows us to make such a qualitative Markov assumption in a relatively straightforward way, and show how the Ma Show Context Citation Context All that is necessary is to describe the probability of state transitions. Another problem with a straightforward use of probability is that, in many situations, an agent may not know the exact probability of various state transitions, although he may have some more quali Interestingly enough, this framework reveals to be appropriate for the efficient network simulation of phenomena such as the spontaneous release of neurotransmitter, useful for detailed investigations of the contribution of miniature Using Limited Information to Enhance Group Stability by Sandip Sen, Ip Sen, Neeraj Arora, Shounak Roychowdhury - International Journal of Human Computer Studies , " The performance of individual agents in a group depends critically on the quality of information available to them about local and global goals and resources. In general it is assumed that the more accurate and comprehensive the available information, the better is the expected performance of the in In general it is assumed that the more accurate and comprehensive the available information, the better is the expected performance of the individual and the group. We investigate the use of limited information by agents in choosing between one of several different options, and conclude that if agents are kept ignorant about, or they deliberately ignore, any number of options, the group can converge faster to a stable and optimal configuration. We present a probabilistic analysis that sheds light on the observed phenomenon of quicker

system convergence with less global information. This analysis suggests a desirable adaptive behavior on the part of individual agents. Experiments with agents following these adaptive behavior exhibits faster convergence. Beerel , " This paper presents an efficient method for state classification of finite Markov chains using BDD-based symbolic techniques. The method exploits the fundamental properties of a Markov chain and classifies the state space by iteratively applying reachability analysis. We compare our method with t We compare our method with the current state-of-the-art technique [1] which requires the computation of the transitive closure of the transition relation of a Markov chain. Experiments in over a dozen of synchronous and asynchronous systems demonstrate that the present method dramatically reduces with up to several orders of magnitude the CPU time needed, and solves much larger problems because of reduced memory requirements. Identification of transient states and all the recurrent classes plays A discrete-event simulation model for dynamic function personliazation in generalizaed software functions by Prateeti Mohapatra, Howard E. Michel - In Proceedings of the international conference on artificial intelligence, â€" Las Vegas , " Abstract-Generalized software packages endowed with a large spectrum of functionalities are often underutilized because users are not always aware of all the existing and newly introduced functionalities. Displaying personalized information about the package is very useful here. In an earlier work, In an earlier work, a Markov decision model had been formulated for a demo package of ActiveX Servers and Controls to select higher utility software functions states for dynamically displaying them to a user. Graduate students had tested the package. The test results have helped in constructing the transition probability matrix and the holding time matrix. This paper describes a discrete-event simulation model of user behavior in such a generalized software package. The simulation results confirm the use of personalization features in generalized software packages. Uniform random numbers were generated to find transition probability values t Performance-Oriented Refinement by Stefan Hallerstede , " We introduce the probabilistic action system formalism which combines refinement with performance. Performance is expressed by means of probability and expected costs. Probability is needed to express uncertainty present in physical environments. Expected costs express physical or abstract quantitie Expected costs express physical or abstract quantities that describe a system. They encode the performance objective. The behaviour of probabilistic action systems is described by traces of expected costs. Corresponding notions of refinement and simulation-based proof rules are introduced. Formal notations like B [2] or action systems [8] support a notion of refinement. Refinement relates an abstract specification A to a more deterministic concrete specification C. Knowing A and C one proves C refines, or implements, specification A. In this study we consider specification A as given and concern ourselves with a way to find a good candidate for specification according to their performance. Abstractâ€"Providers of cloud services as well as the cloud services themselves differ in the business models, functionality, quality of service, cost, value, etc. Beyond that the complexity and lack of transparency with respect to cost and Beyond that the complexity and lack of transparency with respect to cost and quality render the run-time adaptation and replacement of services almost impossible. This position paper presents main results of our recent efforts towards development of a decision support method DSM in multi-clouds. The DSM aims at taking into account risk, quality and cost aspects in order to assist a decision maker in choosing providers and services in a multi-cloud environment. We characterize the needs for the DSM in the multi-cloud context and propose an initial version of the process for the DSM. Based on the method proposed and the needs identified, we elaborate to what degree the current state of the art can be leveraged and what further multi-clouds-specific extensions are needed. Keywordsâ€"multi-cloud; decision support; risk assessment; quality prediction; cost prediction; architectural design; trade-off analysis; cloud service selection; cloud provider selection. Agte, Qiqi Wang , "

Chapter 3 : Dynamic Probabilistic Systems, Volume I: Markov Models

Dynamic Probabilistic Systems, Volume I: Markov Models by Ronald A. Howard This book is an integrated work published in two volumes. The first volume treats the basic Markov process and its variants; the second, semi-Markov and decision processes.

Chapter 4 : Dynamic Probabilistic Systems, Volume I: Markov Models by Ronald A. Howard

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