

PREMIÈRE ÉDITION DU SÉMINAIRE DES DOCTORANT(E)S EN INFORMATIQUE DE LA SIF

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1 EXPOSÉS INVITÉS

1.1 Serge Abiteboul

BIOGRAPHIE. Professeur à l'ENS Cachan et directeur de recherche à l'INRIA, membre de l'Académie des Sciences depuis 2008. Ses thématiques de recherche portent notamment sur la théorie des bases de données, mais aussi la gestion d'information sur le Web et plus généralement de données distribuées. Serge Abiteboul a été nommé membre du Conseil National du Numérique en Janvier 2013 pour une durée de 3 ans. Il a également été le président du Conseil Scientifique de la Société Informatique de France de 2012 à 2014.

1.2 Gilles Dowek. *Une deuxième révolution galiléenne ?*

BIOGRAPHIE. Professeur à l'ENS Cachan et chercheur à l'INRIA. Il s'intéresse à la formalisation des mathématiques, aux systèmes de traitement des démonstrations, à la physique du calcul et à la sûreté des systèmes aéronautiques et spatiaux. Il est membre du groupe ITIC commun à la Société Informatique de France et à l'association Enseignement public informatique. Il a également été consultant pour le National Institute of Aerospace, qui est un laboratoire du centre de recherche de la NASA à Langley.

2 PRÉSENTATIONS COURTES

2.1 Marwa Boulakbech, Nizar Messai, Yacine Sam, and Thomas Devoegele. *Restful Web Services Composition : A Configuration Based Approach*

ABSTRACT. Restful Web Services are more and more used as a light-weight approach for services provisioning on the Web. Few methods exist in the literature that compose this kind of services in a user-centric view, i.e., that take into account user preferences/constraints when doing services composition. In this work, we present an approach for Web services composition based on configuration theory, a well-established contribution in artificial intelligence domain for composing objects in presence of constraints.

KEYWORDS. Restful web service, Web services composition, data mashups

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2.2 Simon Halfon. *Systèmes de Transitions Bien Structurés et Complexité*

ABSTRACT. La vérification automatique consiste à abstraire des programmes dans des modèles computationnels pour lesquels on peut algorithmiquement vérifier certaines propriétés. Un exemple essentiel est l'exécution sans bug d'un programme, modélisée le plus souvent pour la non-accessibilité de "mauvais" états de contrôles. De nombreux modèles utilisés en vérification font partie de la classe particulière des systèmes bien structurés : les transitions du systèmes sont "monotones" pour un beau pré-ordre (wqo). Pour ces modèles là, il existe des algorithmes génériques pour résoudre les questions les plus fréquentes, dont la terminaison repose sur le wqo. Une analyse mathématique du wqo sous-jacent permet même d'extraire des bornes de complexité sur les problèmes étudiés. Néanmoins, pour exprimer ses bornes, il est nécessaire de définir de nouvelles classes de complexité.

KEYWORDS. Vérification, Complexité, Systèmes bien structurés, Complexité non élémentaire

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2.3 Fabrice Mayran de Chamisso, Laurent Soulier and Michael Aupetit. *Lifelong Exploratory Navigation*

ABSTRACT. Lifelong Exploratory Navigation is a new paradigm integrating planning, navigation and Simultaneous Localization and Mapping (SLAM) for embedded real-time learning and decision in mobile robots with finite resources. Implementing Lifelong Exploratory Navigation requires modifications of existing algorithms as well as new algorithms. Notably, an exploratory planner is required, and the SLAM algorithm should be modified to enable planning and navigation while running SLAM.

KEYWORDS. Mobile robot, Navigation, Planning, SLAM, Finite memory, Finite computing resources

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2.4 Kenza Kellou-Menouer and Zoubida Kedad. *Schema Discovery in RDF Data Sources*

ABSTRACT. The Web has become a huge information space consisting of interlinked datasets, enabling the design of novel applications. The meaningful usage of these datasets is a challenge, as it requires

some knowledge about their content such as their types and properties. We propose an automatic approach for schema discovery in RDF(S)/OWL datasets. We consider a schema as a set of type and link definitions. Our contributions are the followings : (i) generating the types describing a dataset, along with a description for each of them called type profile ; (ii) generating the semantic links between types as well as the hierarchical links through the analysis of type profiles ; (iii) proposing a set of annotation algorithms each one providing the names which best capture the semantics of the discovered types. Our approach relies on a density-based clustering algorithm and it does not require any schema-related information in the dataset. We have evaluated our approach on real datasets to illustrate its effectiveness.

KEYWORDS. Schema Extraction, Clustering, Annotation, Semantic Web

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2.5 Fahima Djelil. *Un nouveau micromonde basé sur un jeu de construction 3D pour l'apprentissage de la Programmation Orientée-Objet en C++ : PrOgO*

ABSTRACT. PrOgO est un micromonde de programmation basé sur un jeu de construction 3D, pour l'apprentissage des concepts fondamentaux de la Programmation-Orientée Objet (POO) en C++. Conçu sur la base d'autres micromondes existants, il vise à réduire la complexité de l'apprentissage de la POO aux étudiants débutants. Il se différencie par le fait qu'il représente le concept élémentaire d'Objet au moyen d'un composant graphique 3D représentant une pièce de jeu de construction. Il dispose également d'un éditeur de code à auto-complétion entièrement synchronisé avec l'environnement virtuel, permettant aux étudiants d'implémenter les concepts de POO sans se soucier d'erreurs de syntaxe. Cette présentation a pour objectif de donner une brève description de l'environnement PrOgO, en montrant comment les concepts de POO sont représentés au sein de cet environnement. Les résultats d'une expérimentation conduite auprès d'étudiants débutants seront également brièvement présentés.

KEYWORDS. PrOgO, Programmation Orientée Objet, Langage de Programmation C++, Apprentissage par le Jeu, Micromondes, Analytique de l'Apprentissage

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2.6 Karel Brinda, Gregory Kucherov, Kamil Salikhov and Maciej Sykulski. *BWT-based indexing structure for metagenomic classification*

ABSTRACT. Metagenomics is a powerful approach to study genetic content of environmental samples, which has been strongly promoted by NGS technologies. One of the main tasks is the assignment of reads of a metagenome to taxonomic units, and the subsequent abundance estimation. Most of recently developed programs for this task (such as LMAT, KRAKEN, KALLISTO) perform the assignment based on shared k-mers between reads and references. In such an approach, two major algorithmic subproblems can be distinguished : designing a k-mer index for a huge database of reference genomes and a given taxonomic tree, and designing an algorithm for assigning reads to taxonomic units from information on shared k-mers. In this talk, we consider the problem of index design and present a novel data structure that provides a full list of genomes containing a queried k-mer. The structure is based on BWT-index applied to sequences encoding k-mers proper to each node of the taxonomic tree. We analyse the usefulness of this index and evaluate it in terms of speed and memory requirements.

KEYWORDS. Bioinformatics, Metagenomics, Taxonomic classification

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2.7 Wafa Badreddine, Claude Chaudet, Federico Petrucci and Maria Potop-Butucaru. *Broadcast Strategies in Wireless Body Area Networks (WBAN)*

ABSTRACT. The rapid advances in sensors and ultra-low power wireless communication has enabled a new generation of wireless sensor networks : Wireless Body Area Networks (WBAN). We first analyze several broadcast strategies inspired from the area of Delay Tolerant Networks (DTN). The proposed strategies are evaluated via the OMNET++ simulator that we enriched with realistic human body mobility models and channel models issued from the recent research on biomedical and health informatics. Contrary to the common expectation, our results show that existing research in DTN cannot be transposed without significant modifications in WBANs area. That is, existing broadcast strategies for DTNs do not perform well with human body mobility. However, our extensive simulations give valuable insights and directions for designing efficient broadcast in WBAN. Furthermore, we propose a novel broadcast strategy that outperforms

the existing ones in terms of end-to-end delay, network coverage and energy consumption.

KEYWORDS. WBAN, DTN, Broadcast, Omnet++

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2.8 Sajida Zouarhi. *Constrained Data Transmission with Critical Services : a QoS-based approach*

ABSTRACT. Transmission of constrained data is a major issue in industrial systems. Today, we find more and more sensitive data in circulation. Regarding the transmission channel, questions of security, confidentiality, but also end-to-end integrity and traceability are hot research topics. It is a major concern in healthcare, especially in telemedicine where telecommunications are used to enable tele-expertise or tele-monitoring services. This is why constrained data can only be correctly handled by critical services. With the Internet of Things, the world is becoming a connected place, which is why it is important as of now to understand and anticipate the risks that come along with this transformation and the need of Trust expressed by the users.

KEYWORDS. Constrained data, Critical service, QoS, End-to-end, SLA, Trust, Blockchain

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2.9 Julien Fradin. *Searching in large biologic graphs : a functional view*

ABSTRACT. In the field of biology, people are used to work with big graphs. These graphs can be PPIs (Protein Protein Interaction) graphs where nodes represent proteins linked with an edge when there is a biological interaction. They can also be tandem mass spectrum graphs where the nodes are molecules and arcs between two nodes represent the fact that the second one is a submolecule of the first one. The coloration of nodes allows to add much more information when needed. For example, in tandem mass spectrometry the same color can be given to nodes when their total mass is close enough. Looking for structural motifs corresponds to the search of a small graph in a big graph. The important noise in biological data makes hard to know what we exactly want to find, or to insure that the solution we seek will not be altered by the noise. Therefore, we can also search functional motifs (multisets of colors). Hence, the goal is to find a connected subset of nodes matching the motif. Searching functional motifs refers to the Graph Motif problem, that was introduced ten years ago [1] and has

a lot of variants. There exists a vast literature on this problem. Unfortunately, it becomes quickly very hard to obtain an exact solution. My PhD consists in doing an algorithmic study on this range of problems. With this aim in mind, we can for example search for good FPT (Fixed-Parameter Tractable) algorithms. FPT algorithms try to contain the hardness of a problem in a chosen parameter to give an exact solution in a reasonable amount of time .

KEYWORDS. Graph Motif, Fixed-Parameter, Tractable algorithms, Bioinformatic

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2.10 Mounir Nasr Allah, Guillaume Hiet, Muhammad Abdul Wahab, Pascal Cotret, Vianney Lapôtre and Guy Gogniat. *HardBlare : a hardware-assisted approach for Dynamic Information Flow Tracking targeting embedded processors*

ABSTRACT. The HardBlare project proposes a software/hardware co-design methodology to ensure that security properties are preserved all along the execution of the system but also during files storage. Based on the Dynamic Information Flow Tracking (DIFT) that generally consists in attaching tags to denote the type of information that are saved or generated within the system. These tags are then propagated when the system evolves and information flow control is performed in order to guarantee the safe execution and storage within the system monitored by security policies. This work presents an efficient approach for SoC-based DIFT. We propose to use existing debug components in ARM CPUs to partially recover information required to decouple data and tags computation. The remaining information is obtained through static analysis. During the compilation phase, a static analysis is performed on the LLVM intermediate representation (IR) produced from the the source code, and propagated to the ARM backend for the machine code generation. This IR has a Static Single Assignment form, providing type safety and the capability of representing "all" high-level languages. The result of static analysis gives the dependencies between registers, memory spaces, which are stored on a dedicated section into the result ELF File. Those annotations are later consumed by the coprocessor to propagate the related tags. The coprocessor also checks if the information flow between two registers or memory addresses is "allowed" according to user-defined security policies. If a tag check fails, an interruption is raised. Our approach can be used to detect intrusions at runtime, to help security analysts to find vulnerabilities or to study malware.

KEYWORDS. Dynamic information flow control, Static Analysis, FPGA, Kernel (OS)

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2.11 Sara Bouzit. *Conduite du changement en plasticité des Interfaces Homme-Machine*

ABSTRACT. L'interaction homme-machine (IHM) est un dialogue permanent entre d'un côté un individu aux capacités cognitives a priori inconnues, à la perception imparfaite et aux manipulations parfois entachées d'erreurs, et de l'autre côté une ou plusieurs machines au comportement a priori prédéterminé mais placées au sein d'un écosystème pouvant générer une certaine part d'incertitude. Lorsque deux individus interagissent entre eux, ils ajustent leur dialogue sur plusieurs plans modaux et cognitifs. Mais lorsqu'il s'agit d'interagir avec une machine, les choses se compliquent car cette dernière est peu encline à l'ajustement. La solution à envisager dans un tel contexte, est l'adaptation de l'interface utilisateur afin de faciliter l'interaction homme-machine. En revanche, la question de l'adaptation est traitée selon de nombreux points de vue, celui de la machine, celui de l'utilisateur, celui du développeur. De son côté, l'utilisateur non expert est centré sur une logique d'usage qu'il va devoir faire évoluer, alors que la machine est basée sur une logique de fonctionnement, plutôt fixée a priori. Dans le cadre de la thèse, nous avons proposé plusieurs techniques d'interaction pour les dispositifs de petits écrans (smartphones). Ces techniques ont été testées avec des utilisateurs finaux et les résultats obtenus ont été encourageants en termes de performance et taux d'erreur. La navigation dans une arborescence sur un smartphone a été également étudiée et une technique d'adaptation a été mise en œuvre et testée. La réflexion sur les résultats des expérimentations effectuées nous a menée à mettre en place un espace de conception pour les interfaces adaptatives dans le but d'aider les concepteurs et développeurs à développer des interfaces efficaces. Les différentes techniques ainsi que les résultats des expérimentations seront brièvement présentés.

KEYWORDS. Adaptation des interfaces utilisateurs, Interface utilisateur adaptative, Interface utilisateur intelligente, Performance, Navigation, Apprentissage

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- 2.12 Daniel Balouek-Thomert, Eddy Caron and Laurent Lefevre.
Modulating Cloud Computing Dynamics for maximizing Service Quality and minimizing Environmental Impact

ABSTRACT. As the demand for Cloud infrastructures increases dramatically across the globe, the reduction of energy consumption in such infrastructures has become a challenge, urging for solutions that concurrently mitigate the environmental impact while maximizing the economic benefits. In this context, we intend to perform an efficient selection of resources with respect to a certain quality of service (mainly throughput of computing tasks) and energy consumption. The implementation of the task-to-resource allocation policy consists in picking in real time at Cloud provider's end the best combination of resources, in order to fit the customer's needs at lowest cost and risk with respect to his preferences, and lowest energy consumption. The outcome of this research work brings an interface to express tradeoffs that allows end-users/customers to take over, manage and optimize permanently their distributed IT infrastructure, in a highly flexible and real-time manner. Validation and Experimentation have been performed on a large-scale and versatile testbed for experiment-driven, namely Grid'5000, using the DIET middleware (<http://graal.ens-lyon.fr/DIET/>).

KEYWORDS. Cloud Computing, Workload Placement, Energy Efficiency, Scheduling

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- 2.13 Yannick Zakowski. *Verified Compilation of Linearizable Operations using Rely-Guarantee Atomicity Proofs*

ABSTRACT. Modern programming language libraries implement concurrent services and data-structures by means of fine-grained concurrent primitives, in order to avoid costly synchronization mechanisms such as locks. While each implementation may be interleaved during thread execution, the use of linearizable operations gives the illusion they have been executed in one single atomic step. Reasoning about such fine-grained programs is however difficult since it involves intricate interference between threads and maintaining complex invariants. Rely-guarantee program logics allow for dealing with interference, modeling the interactions between a thread and its environment in a Hoare like proof. Vafeiadis has designed a methodology to show linearizability of concurrent primitives under the form of a rely-guarantee proof of programs mixing an abstract view of the primitive and its concrete implementation. In this paper, we design a compiler that replaces abstract atomic operations by their

fine-grained implementation and prove in Coq the soundness of this compiler with respect to an operational semantics. Our proof is based on backward simulation diagrams derived from rely-guarantee deductive proofs à la Vafeiadis.

KEYWORDS. Concurrency, Fine-grained data structures, Formal proof, Rely-Guarantee Logics

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2.14 Gabriela Paris and Clément Charpentier. *The edge coloring game on caterpillars*

ABSTRACT. Given a graph G and a set of colors $C=c_1, \dots, c_k$ two players alternate turns to color properly an edge of the graph with colors from C . We say an edge is properly colored if the colors of its incident edges are different from its own. If the first player to play, say Alice, manages to color all the graph with the set of colors, she wins. Otherwise the other player, say Bob, wins. In other words Bob wins if at some point during the game there is an uncolored edge incident to all the colors of C . In this talk, I will consider this game on caterpillars. A caterpillar is a path with additional leaves in internal vertices. We are going to see how to compute the game coloring index of caterpillars of known maximum degree and how to play optimally to obtain this bound.

KEYWORDS. Game chromatic index, Caterpillars, Edge marking game

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2.15 Antoine Dailly. *Union vertex-distinguishing edge coloring on graphs*

ABSTRACT. A graph $G(V,E)$ is a set of vertices V and a set of edges E such that an edge links two vertices. We want to identify each vertex of a given graph by a unique label. In order to achieve this, we color the edges of the graph by associating a set of colors to each one of them, and we define the label of a vertex as the union of the sets of colors associated to its incident edges. For the sake of convenience, the colors are represented by integers. Such a coloring is said to be union vertex-distinguishing if the labels of every pair of distinct vertices are different. Due to the definition of the labeling, the graphs we are studying do not have any connected component of one or two vertices. Since using k colors gives us $2^k - 1$ distinct nonempty subsets, we

can identify at most $2^k - 1$ vertices with k colors. This means that, for any graph $G(V,E)$, we need at least $\log(|V| + 1)$ colors to have a union vertex-distinguishing edge coloring of G . Some graphs require more colors, but we prove that we need at most $\log(|V| + 1) + 2$ colors to find a union vertex-distinguishing coloring of any graph $G(V,E)$, and we even conjecture that only $\log(|V| + 1) + 1$ colors are enough.

KEYWORDS. Graph, Graph theory, Identification

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2.16 Fatma Miladi. *Adaptation of Serious Game Scenarios*

ABSTRACT. Serious Games are considered as important topic for both academia and industry. A serious game can be defined as « a virtual environment and a gaming experience in which the contents that we want to teach can be naturally embedded with some contextual relevance in terms of the game-playing ». In this work, we are interested on the issue of adaptation of serious game scenarios according to learners' profiles. Our objective is to implement just-in-time and dynamic adaptation in order to help learners to better progress in the game while maintaining fun, immersion, flow experience, and the motivation to play and, therefore, to learn. Our approach is based on the analysis of data traces from players' interactions by using educational data mining methods. In this research, we have identified four steps : (1) identification of classes of learners' behaviors (offline), (2) detection of a new player's behavior, (3) prediction of his future behavior and (4) dynamic and just-in-time adaptation of the player's scenario. The last three steps are performed online.

KEYWORDS. Serious Games, Adaptation, Educational Data Mining

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2.17 Maël Can. *Overlapping Community Detection by Local Decentralised Vertex-centred Process*

ABSTRACT. Community structure is a an important characteristic of human mobile opportunistic networks that helps to understand their topology and improve routing. I will talk about LOCNeSs, a algorithm specially designed to identify overlapping communities in such networks, allowing nodes to simultaneously belong to several communities, being able to run in a decentralised environment and to limit propagation, two characteristics that constitute crucial requirements.

KEYWORDS. Networks, Community structure, Community detection, Overlapping communities

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3 POSTERS

3.1 Samy Abbes, Sébastien Gouëzel, Vincent Jugé and Jean Mairesse. *Uniform Generation of Braids*

ABSTRACT. This poster tackles two questions :

1. How efficiently can we generate braids of a given length uniformly at random ?
2. What if the length becomes arbitrarily large ?

KEYWORDS. Braids, Combinatorial algebra, Uniform, sampling, Markov process

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3.2 Marwa Boulakbech, Nizar Messai, Yacine Sam, and Thomas Devogele. *Restful Web Services Composition : A Configuration Based Approach*

cf. p. (2.1)

3.3 Hoang Gia Nguyen.

ABSTRACT. Nowadays, hardware and software systems (such as airplanes, satellites, metros, cars, network protocols, etc.) become more and more complex. Their failure due to unsuspected errors may lead to dramatic consequences, and testing such systems is not sufficient. Therefore, formal verification is required. Parametric timed automata (PTA) are a formalism allowing the specification and parametric model checking of systems with hard timing constraints incompletely specified, or subject to future changes. Among the parametric model checking algorithms, the behavioral cartography algorithm splits the parameter space of PTA in tiles in which the discrete behavior is uniform. Applications include the optimization of timing constants, and the measure of the system robustness (w.r.t. the discrete behavior). However, parametric model checking real-world system models is impractical to most computers, as such verification techniques exhaustively may take beyond a lifetime and available memory. Distributed computing takes advantage of networked computers which communicate with each other by passing messages. All computers on the

network will work simultaneously in order to accelerate computational processing. Redesigning parametric verification algorithms to adapt to the distributed paradigm is important so as to considerably increase their efficiency and their performance. Here we present several distributed algorithms to compute the behavioral cartography of PTA efficiently. Our experimental results show a very promising decrease in the computation time when compared to the monolithic (i.e. non-distributed) algorithm.

KEYWORDS. Distributed computing, Model checking, Verification

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3.4 Fabrice Mayran de Chamisso, Laurent Soulier and Michael Aupetit. *Lifelong Exploratory Navigation*

cf. p. (2.3)

3.5 Kenza Kellou-Menouer and Zoubida Kedad. *Schema Discovery in RDF Data Sources*

cf. p. (2.4)

3.6 Fahima Djelil. *Un nouveau micromonde basé sur un jeu de construction 3D pour l'apprentissage de la Programmation Orientée-Objet en C++ : PrOgO*

cf. p. (2.5)

3.7 Sara Zermani. *PICS PROJECT : Self-Adaptive HW/SW Architecture for UAV*

ABSTRACT. This paper provides an overview of the PICS project. The framework of the PICS is the control of SWARMS of autonomous UAVs, including research topics such as the design of embedded systems, human machine interfaces and advanced algorithms for trajectory management. In practice, the project mainly focuses on embedded systems and mission planning. The mission planning includes the Health Management and Decision making that is necessary for the reliability of the mission. The main goal of the PICS project is to integrate a flight management system including multiple applications that are required during the UAV's mission in the same design. It is necessary to execute these applications under several requirements using an architecture with high computation capability, low power consumption, flexibility, low memory, and small size.

KEYWORDS. UAV, Mission planning, Health Management, Decision Making, Embedded applications

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3.8 Laurent Feuilloley, Juho Hirvonen and Jukka Suomela. *Locally Optimal Load Balancing*

ABSTRACT. This work studies distributed algorithms for locally optimal load-balancing : We are given a graph of maximum degree Δ , and each node has up to L units of load. The task is to distribute the load more evenly so that the loads of adjacent nodes differ by at most 1. If the graph is a path ($\Delta=2$), it is easy to solve the fractional version of the problem in $O(L)$ communication rounds, independently of the number of nodes. We show that this is tight, and we show that it is possible to solve also the discrete version of the problem in $O(L)$ rounds in paths. For the general case ($\Delta>2$), we show that fractional load balancing can be solved in $\text{poly}(L,\Delta)$ rounds and discrete load balancing in $f(L,\Delta)$ rounds for some function f , independently of the number of nodes.

KEYWORDS. Distributed computing, Locality, Load balancing

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3.9 Karim Kecir. *Simulation of Urban Rail Systems under Regulation*

ABSTRACT. This work aims at presenting an approach and providing a tool for the evaluation of urban rail traffic regulation techniques and the assessment of timetables robustness with respect to perturbations. Metro networks traffic is very often subject to different perturbations due to causes that range from doors blocked by passengers to equipment failure ; such incidents cause delays. Metro service providers are bound to ensure a certain level of quality of service and use different traffic regulation techniques to mitigate delays and their effects, as much as possible, to converge back to a reference timetable. In the here presented work, systems are mainly modeled using a variant of stochastic time Petri nets, and a stochastic discrete-event Monte Carlo simulation method is used to evaluate regulation techniques applied on a given system. An example of application on a real system is also provided.

KEYWORDS. Discrete-event simulation, Stochastic time Petri nets, Urban Rail systems, Traffic regulation, Monte Carlo

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3.10 Thomas Lambert. *Partitionnement de carré pour le calcul parallèle du produit de matrices*

ABSTRACT. Nous nous intéressons ici à un problème particulier de partitionnement de carré. Le but est de partitionner un carré (a priori unitaire) en différentes sections d'aires données en minimisant la somme des demi-périmètres des rectangles couvrants. Ce problème a une application directe avec la minimisation des communications lors du calcul parallèle d'un produit de matrices. Ce problème a déjà été étudié antérieurement, il a été prouvé NP-complet et quelques algorithmes d'approximations existent. Dans ce poster nous présentons les deux avancées que nous avons faites sur ce problème. En premier lieu une étude comparative entre les stratégies dynamiques et statiques qui existent, les unes assurant un temps de complétion optimal, les autres assurant un volume de communication faible, et nous avons proposé quelques stratégies hybrides permettant d'obtenir les avantages de ces deux approches. Dans un second temps nous avons aussi amélioré le ratio d'approximation existant jusque là pour le descendre aux alentours de 1.15 grâce à un algorithme récursif : NRRP.

KEYWORDS. Ordonnancement, Produit de matrices, Calcul parallèle, Algorithmes d'approximations, Stratégies dynamiques et statiques

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3.11 Yoann Dufresne, Laurent Noé, Valerie Leclere and Maude Pupin. *Algorithms for Non Ribosomal Peptides*

ABSTRACT. La bioinformatique est un domaine en pleine effervescence. C'est un domaine issu de la nécessité de traiter de grandes masses de données biologiques pour comprendre des mécanismes jusqu'à lors inconnus du vivant. L'un des pans de ce domaine concerne l'étude de textes. L'ADN ainsi que bien d'autres composants de la cellule peuvent être représentés comme des chaînes de caractères. En comparant ces chaînes on peut par exemple calculer les différences et ressemblances entre espèces et essayer de construire un arbre du vivant. On peut également comparer des séquences entre individus d'une même espèce ce qui permet de différents différents variants génétiques et par exemple de comparer des patrimoines génétiques entre personnes malades et personnes saines. Un second pan de la bioinformatique est l'analyse des structures des molécules produites par la cellule afin de déterminer leurs fonctionnalités. Comprendre ces fonctionnalités permet par exemple de comprendre des

mécanismes d'interaction entre molécules ou de créer de nouveaux médicaments. Il existe également de nombreux autres aspects de la bioinformatique tels que l'étude des systèmes biologiques composés de nombreuses entités ou l'étude de dynamiques de populations. Sur mon poster je ne développerai que les deux premiers aspects que je présente ici car ils sont directement en rapport avec ma thèse.

KEYWORDS. Bio-informatics, Algorithms, Non Ribosomal Peptides

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3.12 Wafa Badreddine, Claude Chaudet, Federico Petruzzi and Maria Potop-Butucaru. *Broadcast Strategies in Wireless Body Area Networks (WBAN)*

cf. p. (2.7)

3.13 Mounir Nasr Allah, Guillaume Hiet, Muhammad Abdul Wahab, Pascal Cotret, Vianney Lapôtre and Guy Cogniat. *HardBlare : a hardware-assisted approach for Dynamic Information Flow Tracking targeting embedded processors*

cf. p. (2.10)

3.14 Afef Awadid, Selmin Nurcan and Sonia Ayachi Ghannouchi. *An approach for consistency among multi-perspective business process models*

ABSTRACT. At the present stage of our work, we focus on the business process modeling formalisms of Enterprise Knowledge Development (EKD) namely actor-role, role-activity and business objects formalisms. Thereby, in order to enhance the syntactic and semantic quality of EKD business process models, we have proposed a set of consistency rules controlling their dependencies. As the definition of semantic consistency rules is far from obvious, we have modeled and investigated a plethora of business processes (14 business processes) from different domains. Our proposal has been supported by a tool in order to promote an automated consistency handling and hence to save the time and efforts of process modelers. We intend to investigate the possibility of applying the defined consistency rules to other business process modeling methods or standards such as BPMN, UML and ARIS and to reason on one model in order to deduce coherent other ones. This will be the cornerstone of our general approach.

KEYWORDS. Business process models, Inter-model consistency, Modeling perspectives, Consistency rules

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3.15 Daniel Balouek-Thomert, Eddy Caron and Laurent Lefevre. *Modulating Cloud Computing Dynamics for maximizing Service Quality and minimizing Environmental Impact*

cf. p (2.12)

3.16 Yannick Zakowski. *Verified Compilation of Linearizable Operations using Rely-Guarantee Atomicity Proofs*

cf. p (2.13)

3.17 Mathieu Guinebert. *Framework for assessing players' interaction in multiplayer Learning games*

ABSTRACT. Poster on my thesis. I study the interactions between players in multiplayer serious games.

KEYWORDS. Serious Games, Multiplayer, Interactions

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3.18 Abderrahmen Kammoun, Kamal Singh, Philippe Vial and Jacques Fayolle. *Big data analysis for intelligent management of water distribution*

ABSTRACT. Sensorization of the real world will lead to a green field of novel monitoring and control applications with high-volume and low-latency processing requirements. Nevertheless, applications that require real-time processing of data streams generated by multitudes of sensors demand for efficient event stream processing systems. In the context of smart cities, we need event stream processing systems capable of handling millions of events at real-time and near real-time speeds. We require to detect patterns in the huge flow of events and need to generate Alarms in real-time. One of the approaches to do that is called CEP (Complex Event Processing), which enables us to detect complex events by combining primitive and simple events. This work aims to optimize the architecture and find efficient algorithms for pattern matching over real time streams using CEP. We work on integration and reasoning on heterogeneous data. The focus is to reuse detected events and existing results to detect more complex event.

Moreover, we investigate distributed and parallel pattern matching over stream processing.

KEYWORDS. Event stream processing, Pattern Matching, Big Data, Water Management

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