Medusa A Parallel Graph Processing System On Graphics

Parallel Graph Processing Using Depth-first Search and Breadth-first SearchExploration of Parallel Graph-processing Algorithms on Distributed ArchitecturesParallel Graph Processing Using Depth-first SearchDatabase Systems for Advanced ApplicationsLarge-scale Graph Analysis: System, Algorithm and OptimizationDistributed Graph AnalyticsApache Spark Graph ProcessingCloud Computing for Data-Intensive ApplicationsImplementation of Parallel Graph Algorithms on a Massively Parallel SIMD Computer with Virtual ProcessingProceedings of a Conference on Theoretical Computer Science, August 15-17, 1977, University of Waterloo, Waterloo, Ontario, CanadaCybersecurity and High-Performance Computing EnvironmentsProceedings of the 1987 International Conference on Parallel ProcessingSmart Societies, Infrastructure, Technologies and ApplicationsIEEE ... Workshop on Multimedia Signal ProcessingJournal of Combinatorics, Information & System SciencesOptimizing Parallel Graph Algorithms by Extending the GraphIt DSLProceedings1984 IEEE Workshop on Languages for Automation1986 ProceedingsThe Australian Computer Journal Denise Marie Eckstein Julien Collet D. M. Eckstein Guoliang Li Yingxia Shao Unnikrishnan Cheramangalath Rindra Ramamonjison Xiaolin Li University of Texas at Austin. Dept. of Computer Sciences Kuan-Ching Li Sartaj Sahni Rashid Mehmood Tugsbayasgalan Manlaibaatar Harold S. Stone

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with the advent of ever increasing graph datasets in a large number of domains parallel graph processing applications deployed on distributed architectures are more and more needed to cope with the growing demand for memory and compute resources though large scale distributed architectures are available notably in the high performance computing hpc domain the programming and deployment complexity of such graphprocessing algorithms whose parallelization and complexity are highly data dependent hamper usability moreover the difficult evaluation of performance behaviors of these applications complexifies the assessment of the relevance of the used architecture with this in mind this thesis work deals with the exploration of graph processing algorithms on distributed architectures notably using graphlab a state of the art graphprocessing framework two use cases are considered for each a parallel implementation is proposed and deployed on several distributed architectures of varying scales this study highlights operating ranges which can eventually be leveraged to appropriately select a relevant operating point with respect to the datasets processed and used cluster nodes further study enables a performance comparison of commodity cluster architectures and higher end compute servers using the two use cases previously developed this study highlights the particular relevance of using clustered commodity workstations which are considerably cheaper and simpler with respect to node architecture over higher end systems in this applicative context then this thesis work explores how performance studies are helpful in cluster design for graph processing in particular studying throughput performances of a graph processing system gives fruitful insights for further node architecture improvements moreover this work shows that a more in depth performance analysis can lead to guidelines for the appropriate sizing of a cluster for a given workload paving the way toward resource allocation for graph processing finally hardware improvements for next generations of graph processing servers areproposed and evaluated a flash based victim swap mechanism is proposed for the mitigation of unwanted overloaded operations then the relevance of arm based microservers for graph processing is investigated with a port of graphlab on a nvidia tx2 based architecture

this two volume set lncs 11446 and lncs 11447 constitutes the refereed proceedings of the 24th international conference on database systems for advanced applications dasfaa 2019 held in chiang mai thailand in april 2019 the 92 full papers and 64 short

papers were carefully selected from a total of 501 submissions in addition 13 demo papers and 6 tutorial papers are included the full papers are organized in the following topics big data clustering and classification crowdsourcing data integration embedding graphs knowledge graph machine learning privacy and graph recommendation social network spatial and spatio temporal the short papers demo papers and tutorial papers can be found in the volume lncs 11448 which also includes the workshops of dasfaa 2019

this book introduces readers to a workload aware methodology for large scale graph algorithm optimization in graph computing systems and proposes several optimization techniques that can enable these systems to handle advanced graph algorithms efficiently more concretely it proposes a workload aware cost model to guide the development of high performance algorithms on the basis of the cost model the book subsequently presents a system level optimization resulting in a partition aware graph computing engine page in addition it presents three efficient and scalable advanced graph algorithms the subgraph enumeration cohesive subgraph detection and graph extraction algorithms this book offers a valuable reference guide for junior researchers covering the latest advances in large scale graph analysis and for senior researchers sharing state of the art solutions based on advanced graph algorithms in addition all readers will find a workload aware methodology for designing efficient large scale graph algorithms

this book brings together two important trends graph algorithms and high performance computing efficient and scalable execution of graph processing applications in data or network analysis requires innovations at multiple levels algorithms associated data structures their implementation and tuning to a particular hardware further programming languages and the associated compilers play a crucial role when it comes to automating efficient code generation for various architectures this book discusses the essentials of all these aspects the book is divided into three parts programming languages and their compilation the first part examines the manual parallelization of graph algorithms revealing various parallelization patterns encountered especially when dealing with graphs the second part uses these patterns to provide language constructs that allow a graph algorithm to be specified programmers can work with these language constructs without worrying about their implementation which is the focus of the third part implementation is handled by a compiler which can specialize code generation for a backend device the book also includes suggestive results on different platforms which illustrate and justify the theory and practice covered together the three parts provide the essential ingredients for creating a high performance graph

application the book ends with a section on future directions which offers several pointers to promising topics for future research this book is intended for new researchers as well as graduate and advanced undergraduate students most of the chapters can be read independently by those familiar with the basics of parallel programming and graph algorithms however to make the material more accessible the book includes a brief background on elementary graph algorithms parallel computing and gpus moreover it presents a case study using falcon a domain specific language for graph algorithms to illustrate the concepts

build process and analyze large scale graph data effectively with spark about this book find solutions for every stage of data processing from loading and transforming graph data to improve the scalability of your graphs with a variety of real world applications with complete scala code a concise guide to processing large scale networks with apache spark who this book is for this book is for data scientists and big data developers who want to learn the processing and analyzing graph datasets at scale basic programming experience with scala is assumed basic knowledge of spark is assumed what you will learn write build and deploy spark applications with the scala build tool build and analyze large scale network datasets analyze and transform graphs using rdd and graph specific operations implement new custom graph operations tailored to specific needs develop iterative and efficient graph algorithms using message aggregation and pregel abstraction extract subgraphs and use it to discover common clusters analyze graph data and solve various data science problems using real world datasets in detail apache spark is the next standard of open source cluster computing engine for processing big data many practical computing problems concern large graphs like the graph and various social networks the scale of these graphs in some cases billions of vertices trillions of edges poses challenges to their efficient processing apache spark graphx api combines the advantages of both data parallel and graph parallel systems by efficiently expressing graph computation within the spark data parallel framework this book will teach the user to do graphical programming in apache spark apart from an explanation of the entire process of graphical data analysis you will journey through the creation of graphs its uses its exploration and analysis and finally will also cover the conversion of graph elements into graph structures this book begins with an introduction of the spark system its libraries and the scala build tool using a hands on approach this book will quickly teach you how to install and leverage spark interactively on the command line and in a standalone scala program then it presents all the methods for building spark graphs using illustrative network datasets next it will walk you through the process of exploring visualizing and analyzing different network characteristics this book will also teach you how to transform raw datasets into a usable form in addition you will learn powerful operations that can be used to transform graph elements and graph structures furthermore this book also teaches how to create custom graph

operations that are tailored for specific needs with efficiency in mind the later chapters of this book cover more advanced topics such as clustering graphs implementing graph parallel iterative algorithms and learning methods from graph data style and approach a step by step guide that will walk you through the key ideas and techniques for processing big graph data at scale with practical examples that will ensure an overall understanding of the concepts of spark

this book presents a range of cloud computing platforms for data intensive scientific applications it covers systems that deliver infrastructure as a service including hpc as a service virtual networks as a service scalable and reliable storage algorithms that manage vast cloud resources and applications runtime and programming models that enable pragmatic programming and implementation toolkits for escience applications many scientific applications in clouds are also introduced such as bioinformatics biology weather forecasting and social networks most chapters include case studies cloud computing for data intensive applications targets advanced level students and researchers studying computer science and electrical engineering professionals working in cloud computing networks databases and more will also find this book useful as a reference

abstract we describe our implementation of several pram graph algorithms on the massively parallel computer maspar mp 1 with 16 384 processors our implementation incorporated virtual processing and we present extensive test data in a previous project 13 we reported the implementation of a set of parallel graph algorithms with the constraint that the maximum input size was restricted to be no more than the physical number of processors on the maspar the maspar language mpl that we used for our code does not support virtual processing in this paper we describe a method of simulating virtual processors on the maspar we re coded and fine tuned our earlier parallel graph algorithms to incorporate the usage of virtual processors under the current implementation scheme there is no limit on the number of virtual processors that one can use in the program as long as there is enough main memory to store all the data required during the computation we also give two general optimization techniques to speed up our computation we tested our code with virtual processing on test graphs with various edge densities we also compared the performance data for our parallel code with the performance data of sequential code for these problems we found that the extra overhead for simulating virtual processors is moderate and the performance of our code tracks theoretical predictions quite well although real time speed ups are quite small since the maspar processors are rather slow in addition our parallel code using virtual processing runs on much larger size inputs than our sequential code

in this fast paced global economy academia and industry must innovate to evolve and succeed today s researchers and industry experts are seeking transformative technologies to meet the challenges of tomorrow cutting edge technological advances in cybersecurity solutions aid in enabling the security of complex heterogeneous high performance computing hpc environments on the other hand hpc facilitates powerful and intelligent innovative models for reducing time to response to identify and resolve a multitude of potential newly emerging cyberattacks cybersecurity and high performance computing environments provides a collection of the current and emergent research innovations practices and applications focusing on the interdependence of cybersecurity and hpc domains for discovering and resolving new emerging cyber threats key features represents a substantial research contribution to the state of the art solutions for addressing the threats to confidentiality integrity and availability cia triad in hpc environments covers the groundbreaking and emergent solutions that utilize the power of the hpc environments to study and understand the emergent multifaceted anomalous and malicious characteristics the content will help university students researchers and professionals understand how hpc research fits broader cybersecurity objectives and vice versa

interest in the field of parallel processing has soared in this decade response to the annual conference held at pheasant run is clear proof in the early 1980s just over 100 papers were submitted each year in 1987 over 400 papers were considered such heightened interest is both gratifying and challenging in that the increasingly demanding applications in science medicine and industry that result from these studies are dependent upon the parallel systems as computing resources the studies in this volume describe recent advances in all aspects of parallel distributed logic circuits impact of vlsi to parallel processor architecture various concurrent distributed parallel pipeline or multiple processor architectures processor memory interconnections computer networks distributed databases reliability and fault tolerance modeling and simulation techniques performance measurements operating systems languages algorithms mathematical analysis and various application studies a rigorous standard governed the paper selection process in an effort to insure that the proceedings reflect the state of the art in parallel processing theory design and applications of vital interest to researchers engineers scientists programmers systems analysts managers and other interested in the design and application of parallel distributed processors and processing

this book constitutes the refereed post conference proceedings of the first international conference on smart cities infrastructures technologies and applications scita 2017 held in jeddah saudi arabia in november 2017 the 35 revised full papers were carefully reviewed and selected from 62 submissions the papers are grouped in topical sections infrastructure track e

governance and transportation track healthcare track applications track

high performance graph processing is often very challenging because real life graphs vastly differ from each other in their sizes and structures therefore we need to use many different graph specific performance optimizations and a programming system that allows domain experts to easily write high performance graph applications graphit a domain specific language is one such programming system that achieves high performance across different algorithms graphs and architectures while offering an easy to use high level programming model graphit decouples algorithms from performance optimizations schedules for graph applications to make it easy to explore a large space of optimizations yet there are still many graph applications that graphit currently doesn t support in this thesis we present a number of new additions to graphit to extend its current use cases namely we introduce a new operator called intersection that is widely used in triangular counting algorithm we also introduce functor and par for to improve current multiple starting point applications by adding nested parallelization using the new features we are able to get up to 16x speedup over the graphit implementation without the added features on road graphs that don t benefit from single level parallelization

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