SCORG 4.0 WORKSHOP

22.12.2016.

Starts at 10:00
RC3 – new wing, 2nd floor
Department of Mathematics and Informatics
Faculty of Sciences
University of Novi Sad

10:00-10:20
Dr. Srdjan Skrbic, Assoc. Prof.
Faculty of Sciences, Novi Sad
SCORG - challenges and opportunities in 2016

10:20-10:40
Emmanouil Koukoutos
Ecole Polytechnique Federale de Lausanne, CH
Synthesis and Repair in the Leon Tool
In this talk, I will present an approach for deductive synthesis and repair, implemented in the publicly available tool Leon (leon.epfl.ch). Synthesis and repair in Leon are aimed at purely functional programs in a subset of Scala containing mutually recursive functions. The generated/ repaired code should provably satisfy a specification, which is given by the programmer in the form of function pre- and postconditions, as well as (possibly symbolic) input-output examples. I will present the basic principles of the tool along with some technical details, as well as some illustrative programs synthesized by our tool. Finally, I will discuss new ideas and future directions.

10:40-11:00
Mikael Mayer
Ecole Polytechnique Federale de Lausanne, CH
A computer which truly understands your desires.
It is hard to generalize the user's desire when you only get some input/output examples of what she wants !
Recently, there has been a turnaround when Mayer et al (2015) showed that programming by example is greatly improved when the computer starts to ask clarification questions, or let the program at the disposal to the user in a readable and clarifiable form.
Generalizing this approach in at least two new domains, namely pretty-printers from examples and websites/powerpoint creation, This talk will illustrates through various demos Mikaël's vision about future software which will allow a smooth transition from visual editors to code editors, for both experts and novices.

11:00-11:20
Dušan Vudragović
Institue of Physics, Belgrade
VI-SEEM Virtual Research Environment
In the last decade, a number of initiatives were crucial for enabling high-quality research in both South-East Europe and Eastern Mediterranean region. This was achieved by providing e-Infrastructure resources, application support and training in these two areas. VI-SEEM project brings together these e-Infrastructures to build capacity and better utilize synergies, for an improved service provision within a unified virtual research environment for the inter-disciplinary scientific user communities in those regions.

The overall aim is to provide user-friendly integrated e-Infrastructure platform for regional cross-border scientific communities in climatology, life sciences, and cultural heritage. This includes linking computing, data, and visualization resources, as well as services, models, software and tools. This virtual research environment provides the scientists and researchers with the support in full lifecycle of collaborative research: accessing and sharing relevant research data, using it with provided codes and tools to carry out new experiments and simulations on large-scale e-Infrastructures, and producing new knowledge and data. The VI-SEEM consortium brings together e-Infrastructure operators and scientific communities in a common endeavor that will be present in this talk. We will also point out how the audience may benefit from this newly created virtual research environment.

11:20-11:40 coffee break

11:40-12:00
Dr. Nootchanath Kongchouy
Prince of Songkla University, Thailand
Displaying Complex Ecological Data and Model

12:00-12:20
Dr. Thakerng Wongsirichot, Assist. Prof.
Prince of Songkla University, Thailand
A Mobile Application Prototype of Biliary Atresia Detection in Children using Image Processing Techniques

12:20-12:40
Dr. Sathit Intajag, Assoc. Prof.
Prince of Songkla University, Thailand
Computation for Visual Image Processing
Computation for visual image processing studies and develops new computational techniques for improving the visual experience of human subjects looking at digital images. It has a wide range of applications in consumer electronics, medical image, remote sensing, and scientific imaging, etc. Our general technique is to develop multi-purpose tools by using image statistics and human vision. We are able to efficiently carry out particular tasks in the image processing such as denoising,

deblurring, enhanced resolution, coding/quantization artifact compensation, etc.

12:40-13:00
Vladimir Loncar
Institue of Physics, Belgrade
Optimization of heterogeneous algorithms using evolutionary computation
Programs running on heterogeneous computing platforms, comprised of computing nodes with several multi-core CPUs and GPUs, are often not easy to optimize. Performance of different hardware architectures may vary significantly, leading to problems when attempting to distribute the work evenly across available resources. Thus, the parameters that control the distribution of work need to be carefully selected to maximize the overlap of computation and communication, and to reduce the idle time of CPUs and GPUs. In this talk we will demonstrate how evolutionary algorithms (EA) can be employed to automatize selection of the best parameters for distributing the work between available CPUs and GPUs. We will describe how EA was implemented, and demonstrate the achieved improvement over more naive approaches, i.e., using brute-force method and simple gradient descent algorithm.

13:00-13:20
Ivan Kuraj
Massachusetts Institute of Technology, USA
Towards an Approach for Compiling Sequential Programs to Implementations of Distributed Systems
Despite many advances in programming models and frameworks, writing distributed applications remains hard. Even when the underlying logic is inherently sequential and simple, addressing distributed aspects results in complex cross-cutting code that undermines such simplicity.
This work motivates a new paradigm that leverages the sequential computation model, while gaining the expressiveness for distribution. The work exhibits a programming model that allows easier reasoning about the conceptual aspects of distributed systems' behavior. The newly proposed programming model provides a clean separation of concerns and retains the simplicity of sequential computation, using it as a basis onto which distributed aspects are added without corrupting the essential sequential structure, while offloading much of the complexity of implementing distributed concerns to the compiler. We demonstrate the feasibility of this model on a case study, identifying key improvements over existing approaches. Our prototype translates Scala programs with specifications into Scala/Akka actorized distributed implementations using the Leon framework.

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