ETAPS Daily

Number 6

Thursday, April 3

March 29-April 6, 2008, Budapest, Hungary

INVITED TALKS

From 09:00, Sharad Malik presents his talk on the boat Europa on *Hardware Verification: Techniques, Methodology and Solutions.*

Sharad Malik is a Professor of Engineering at Department of Electrical Engineering, Princeton University where he is since 1991. His research interest includes design automation for digital systems: design tools for embedded systems, digital circuit theory, synthesis and verification of digital systems.

Igor Walukiewicz deliver his talk on the boat from 14:15 titled *Finding your way in a forest: on different types of trees and their properties.*

Igor Walukiewicz is a Professor at LaBRI Bordeaux with a strong background both in Computer Science and Mathematics. He is interested in decidable characterizations of tree logics, formalisms for real-time systems, game theory and verification of procedural programs and concurrent systems.

INTERVIEWS

Yesterday the first invited talk was given by **Luke Ong** on the possible connection of *verification of functional programs and game semantics*.

ETAPS Daily: What do you see as the main challenge of verification of Higher Order Programs?

Luke Ong: I think there are still interesting theoretical problems to solve, but for me I think this is a good start to construct powerful algorithms to look at the lower order cases. I was just talking to Tom Reps who mentioned that the are some very well-known methods of abstraction are applicable to first order Push Down Automata; a very natural direction would be a kind of extension to higher order PDA.

E.D.: You mentioned that functional programming is becoming more and more widespread. Could you tell us some examples what could be checked in terms of safety?

L.O.: This can be surprising but as far as I know this kind of model checking of functional programming is very much in its infantry. For checking safety properties, we must understand reachability. As I mentioned in my talk, at time I know nobody who has really even asked the question what does reachability mean in FP. I am quite excited about the progress both on the theory side as well as on the practical side.

E.D.: What do you expect Game Semantics can give us in the near future?

E.D.: In the questions session, you mentioned that this kind of static analysis could be used in the development of tools. Could you tell a bit more on this?

L.O.: The question was whether I expect any of those algorithms I mentioned to be used in practice. The complexity is high; however, at the 0 and 1 order it comes more manageable. I envisage the application of some abstraction techniques for certain verification problems of HO programs which can be approximated by some verification problem at the lower order. With some colleagues we are working on the flow analysis of functional programs, which can be approximated as a hierarchy of problems with increasing degree of accuracy.

E.D.: What kind of other problems are you dealing with?

L.O.: I am quite keen to apply semantics and verification methods to analyse concurrent programs of the "multicore world".

The afternoon invited talk was presented by **Tom Reps** titled *WYSINWYX (What You See Is Not What You eXecute)* on analyzing code directly on the machine level.

ETAPS Daily: Can you summarize what are the advantages of working at the machine code level?

Tom Reps: As I mentioned in my talk, one of the surprising advantages was the extent to which you can be more precise by working on machine code than on source code. The reason is that the complier has chosen among alternatives when language let some things to be unspecified and that cuts out some of the paths that the analyzer have to consider. There are some pragmatic advantages like not having to deal with problems of analysing program written in multiple source lan-

guages. Moreover, you do not have to find out what the calls of library L's API calls do and try to extract some stub that is specific to the analysis.

E.D.: You also mentioned a story about about dynamically allocated objects…

T.R.: The surprising thing was that many of those techniques written down in literature was actually not sound. In assembly code that is being created from e.g. C++, the constructor will initialize one field with the address of the virtual function table and than you go down two levels to get the actual function code. We were told that more malware is being written in C++ and their writers are using better structural programs apparently because they were seeing more indirect function calls through the virtual function table. This created a problem for people trying to understand the malware, they saw the similar function call and did not understand what was going there…

So this helped us focus our effort. And I also had done a lot of work with Mooly Sagiv and Reinhard Wilhelm on shape analysis. Some of the things I had learned from that effort contributed to the solution of the problems of dynamically reallocated storage in X86. For instance, we used this in the TVLA system.

E.D.: What was the biggest project which you recently finished with this method?

T.R: The biggest work was presented at TACAS by Gogul Balakrishnan. That was the most complete application we did with the best level of success and there I think we established that it is a viable approach.

CULTURE

The Titanic Filmfestival starts today with an international selection of movies divided into several different thematic and regional sections (recommended to buy tickets in advance, see www.titanicfilmfest.hu,).

In the there is an exhibition "Bubbles from Japan" of the projects of Takaharu Tezuka (e.g., the Snow Museum) in the Hungarian Contemporary Architecture Center (kek.org.hu).

For sightseeing tips, just contact us.

WEATHER FORECAST

Thursday:

Partly Cloudy, Light Showers, 13°C (55 F)/3°C (37 F)

Friday: Cloudy 14°C (57 F) / 4°C (39 F)

PROGRAMME

April 3rd, Thursday

		Magnolia (Thermal)	Ybl (Grand)	Star (Thermal)	Béla (Grand)	Room I (Grand)	Room II (Grand)
9:00	Session 1	Invited talk of Shahad Malik (Europa)			ECSS		
9:30							
10:00		Coffee					
10:30							
11:00	Session 2	FOSSACS Logics	CC Analysis and transformations	TACAS Abstraction, interpolation	ECSS Geir Horn	ECSS Claudio Caimi	ECSS Tomasz Kulisiewicz
11:30							
12:00							
12:30	Lunch						
13:00							
13:30							
14:00	Session 3	Invited talk of Igor Walukiewicz (Europa, 14:15)			ECSS Wrap-up, results, etc. (incl. coffee)		
14:30							
15:00		FOSSACS I Algebraic models I.	FOSSACS II Decision problems II.	TACAS Tools II.			
15:30							
16:00							
16:30	Session 4	Coffee					
17:00		FOSSACS Probabilistic systems	CC Compiling for parallel architectures		TACAS Trust, reputation		
17:30							
18:00							

IMPORTANT CHANGE

FOSSACS II. is moved to room Ybl (Grand Hotel).

Parallel sessions of ECSS will be held in Room Béla, Room I and Room II (all in Grand Hotel).

Please refer to displays in the lobbies.

TRIVIA

The Republic of Hungary has an area of 93000 square km (~36000 square miles) and a population of 10 million. It is the 13th most populated and 12th largest EU country. If it were a US state, it would be the 39th in an area ranking and 9th in a population ranking. Hungary is a fully landlocked country in the Carpathian Basin of Central Europe with a temperate climate and a mostly flat terrain.

Hungarian is a Uralic language, more specifically an Ugric language, thus Hungary is giving one of the three non-Indo-European official languages of the EU. Finnic languages (Finnish, Estonian, Saami) are Uralic languages, as well, but the distance between the Ugric and Finnic languages is great.

Hungarians settled in the late ninth century, and it became a kingdom at 1000. After several changes in the 19th and 20th century it is now a parliamentary republic since 1990, and it joined NATO in 1999 and the EU in 2004.

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