Abu Naser Masud

Postdoctoral researcher
School of Computer Science
Technical University of Madrid, Spain.
Email: mdabu.naser@upm.es, masudku@gmail.com
Web: http://costa.ls.fi.upm.es/~anm/
Contact (Office): +34913365018,
(Mobile): +34695740728, Skype: anm.fm
Nationality: Bangladesh

Relevant Practical Experiences

- April 2009-April 2012

  Costa Research Group, Technical University of Madrid, Spain.

  Project-HATS (Highly Adaptable and Trustworthy Software using Formal Models) is an Integrated Project supported by the 7th Framework Programme of the European Commission within the FET (Future and Emerging Technologies) scheme.

  I have been working full time on designing and developing software in order to estimate the resource consumption of java bytecode program automatically. The work that has been done in this project are as follows:

  - Java bytecode programs have been analyzed and generated the control flow graph of the given bytecode program.
  - From the control flow graph, an abstract program has been generated which we call the cost relations. The semantics of these cost relations are such that they capture the cost of the original bytecode program where the cost can be amount of time or memory or number of visits to a specific program location.
  - Specific methods have been developed for solving the above generated cost relations using static program analysis and symbolic computation methods.
  - The software (called PUBS) is developed using the Prolog programming language. External tools like Parma Polyhedra Library and Maxima recurrence relation solver is used.
  - The web interface of PUBS is available at http://costa.ls.fi.upm.es/~costa/pubs/pubs.php which is running in a Linux server and the web interface is designed using normal HTML, CSS and PHP.

- April 2012-February 2013

  Costa Research Group, Technical University of Madrid, Spain.

Project-HATS

- ⋆ I have developed a tool for the automatic regression test for the PUBS tool. It has been implemented in Prolog language.
- ⋆ I have worked on a research problem of understanding the termination problem of some loops that arise in the context of cost analysis and have developed a method to prove that termination of even some simple loops are undecidable and some other simple loops have EXPSPACE-hard lowerbound. These works are published in the VMCAI 2012 conference and ACM transactions on Programming Languages and Systems (TOPLAS) 2012 journals.

◇ August 2007 -March 2009

International Center for Computational Logic, University of Technology Dresden, Germany

I have been working in the Vereofy model checking tool which is a formal verification tool developed for component-based systems. In this tool, an abstract coordination model called Reo is represented using graph based representation and model checking methods are applied to verify that the coordination meet the specification. My job in this project was as follows:

- ⋆ I have implemented part of the Vereofy tool in representing the Reo model using graphs.
- ⋆ I have developed algorithms and implemented it in the Vereofy tool to minimize the size of the Reo.
- ⋆ I have used C++ and the Boost C++ library in the implementation.

◇ May 2002-July 2007

Khulna University Bangladesh and Technical University of Madrid

- ⋆ I was involved in developing and implementing algorithms for problems for the ACM ICPC programming contests. The problems are defined and provided in the website of ACM ICPC.
- ⋆ Developed a software for clinic management system for the Queens Hospital, Jessore, Bangladesh.
- ⋆ I have used C, C++, Java, Visual Basic and Haskel programming Languages, and SQL Server.

Education

2009–2012	**PhD in computer Science** Technical University of Madrid, Spain. Completed with Cum Laude
2006–2009	**MSc in Computational Logic** University of Technology Dresden, Germany and Technical University of Madrid, Spain. Erasmus Mundus Scholar GPA 1.8 out of 5 (Best Score 1.0)
1997–2001	**BSc in Computer Science and Engineering** Khulna University, Bangladesh. GPA 3.9 out of 4 (Best Score 4.0)

Research Experiences

- Experiences on various static program analysis techniques in inferring program properties like inferring loop invariants and techniques based on abstract interpretation.
- Experiences in using various symbolic computation techniques in program analysis e.g. recurrence relation solver, simplification of polynomial expressions and so on.
- Experiences on using tools (e.g SAT solvers or PPL library) for reasoning on constraints.
- Studied two years on various topics of computational logic like foundation of computational logic, interactive theorem proving, model checking, logic and complexity theory etc.
- Familiar with linear and integer linear programming techniques that can be used to infer quantitative program properties.
- Developed the PUBS (practical upper bound solver) tool which can also infer lower bounds from abstract program models. The web interface of this tool is available at `http://costa.ls.fi.upm.es/~costa/pubs/pubs.php`. This tool has been implemented in Prolog and used some other external tools.
- Developed a tool called REO synthesizer to synthesize a minimized abstract coordination model called REO. It has been implemented in C++ and used the boost C++ library.
- Experiences in programming languages and tools like C/C++, Java, Javascript, Pascal, Prolog (Ciao/Swi), Haskel, Eclipse development environment, Emacs, Latex, PHP, SVN and so on.

Conference/Journal/Theses Papers

- Amir M. Ben-Amram, Samir Genaim, and **Abu Naser Masud**. On the termination of integer loops. *ACM Trans. Program. Lang. Syst.*, 34(4):16:1–16:24, December 2012
- Elvira Albert, Samir Genaim, and **Abu Naser Masud**. On the inference of resource usage upper and lower bounds. *ACM Transactions on Computational Logic*, 2012. To appear
- Amir M. Ben-Amram, Samir Genaim, and **Abu Naser Masud**. On the termination of integer loops. In Viktor Kuncak and Andrey Rybalchenko, editors, *VMCAI*, volume 7148 of *Lecture Notes in Computer Science*, pages 72–87. Springer, 2012
- Elvira Albert, Samir Genaim, and **Abu Naser Masud**. More precise yet widely applicable cost analysis. In Ranjit Jhala and David A. Schmidt, editors, *VMCAI*, volume 6538 of *Lecture Notes in Computer Science*, pages 38–53. Springer, 2011
- Abu Naser Masud. *Termination and Cost Analysis: Complexity and Precision Issues*. PhD dissertation, School of Computer Science, Technical University of Madrid, Spain, February 2013. Advisor: Samir Genaim and German Puebla
- Abu Naser Masud. Minimization methods for exogenous coordination models. MSc dissertation, International Center for Computational Logic, Department of Computer Science, University of Technology Dresden, Germany, March 2009. Advisor: Prof. Christel Baier

Talks

- June 2012: On the termination of integer loops, Imdea Software Institute.
- April 2011: More Precise yet widely applicable cost analysis, COSTA Seminar, UPM
- March 2009: Minimization methods for exogenous coordination models, ICCL, University of Technology, Dresden.
- February 2009: Minimization of Reo circuits, University of Twente, the Netherlands.

Services

iFM'13, ICLP'13

Awards and Funding

- PhD funding granted by the Information and Communication Technologies Program of the European Commission (HATS Project) (From September 2009).
- PhD funding granted by the Spanish Ministry of Science and Innovations (From January 2010).
- PhD funding granted by the Madrid Regional Government (From January 2010).
- Scholarship granted by the European Commission for the Erasmus Mundus program in EMCL Masters course (between October 2006 - July 2008).
- Awarded the first position in BSc in Computer Science and Engineering.
- Scholarships granted by Khulna University and Ministry of Education, Bangladesh (between 1997-2001).

Language Skills

- Bangla and English: Fluent in reading, writing and speaking.
- Spanish: Very Basic, German: Completed A1/2 level.

Career Timeline

1997-2001	Studied BSc in Computer Science and Engineering at Khulna University, Bangladesh
2002-2006	Teaching (undergraduate courses) in Khulna University, Bangladesh
2006-2007	Studied MSc in Computational Logic, Technical University of Madrid, Spain
2007-2009	Studied MSc in Computational Logic, University of Technology, Dresden, Germany
2009-2013	Studied PhD in Computer Science, Technical University of Madrid, Spain
2013-	Postdoctoral researcher at Technical University of Madrid

References

- Samir Genaim
  Lecturer
  Facultad de Informtica
  Complutense University of Madrid
  Phone: +34-91-3947545
  Email: samir.genaim@fdi.ucm.es
- Pedro López-García
  Researcher
  IMDEA Software Institute, Madrid
  SPAIN
  Phone: +34-91-101-2202 ext 4109
  Email: pedro@clip.dia.fi.upm.es
- Germán Puebla
  Associate Professor
  Facultad de Informtica
  Technical University of Madrid
  Phone: +34-91-336-7453
  Email: german@fi.upm.es
- Elvira Albert
  Associate Professor
  Facultad de Informtica
  Complutense University of Madrid
  Phone +34 91 3947641
  Email: elvira@sip.ucm.es