



GAMES Lab (E-Commerce Lab)

Games, Auctions, Markets, Economics, and Social-Networks



ECL Team

Convener

Y. Narahari
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Doctoral and Master's Students

Sujit Gujar (PhD)
Ramasuri Narayanam (PhD)
Rohith (PhD)
Swaprava Nath (PhD)
Sunil Shelke (MSc)
Udayalakshmi (MSc)
Mayur Mohite (ME)
N. Radhika (Project Associate)

Alumni (Doctoral)

Dinesh Garg, Yahoo! Labs, Bangalore
T.S. Chandrashekar, GM ISL, Bangalore
S. Kameshwaran, ISB, Hyderabad
Shantanu Biswas, Infosys Technologies
C.V.L. Raju, London School of Economics
K. Ravikumar, GM ISL, Bangalore
N. Hemachandra, Professor, IIT Bombay
Laaq Mohammad Khan, IT Consultant

The focus of research in the lab is to apply game theory and mechanism design to Internet and Network Economics, and Electronic Commerce Problems. Current topics and problems explored include:

- Dynamic Games and Mechanisms
- Online Mechanisms for Assignments and Matchings
- Incentive Compatible Learning
- Influence Maximization in Social Networks
- Game Theoretic Approach to Social Network Analysis
- Query Incentive Networks
- Prediction Markets
- Sponsored Search Auctions: Bid Optimization and Budget Optimization
- Procurement Auctions and Markets
- Game Theoretic Approach to Global Warming and Carbon Trading

Selected Recent Publications

- Y. Narahari, Dinesh Garg, Ramasuri Narayanam, and Hastagiri Prakash. **Game Theoretic Problems in Network Economics and Mechanism Design Solutions**. Research Monograph, Springer, London
- Devansh Dikshit and Y. Narahari. Honest and quality conscious query incentive networks. *Proceedings of WINE 2009*
- N. Ramasuri and Y. Narahari. Design of an optimal Bayesian incentive compatible broadcast protocol for ad hoc wireless networks with rational nodes. *IEEE Journal on Selected Areas in Commu*
- Dinesh Garg and Y. Narahari. A theory of mechanism design for single leader Stackelberg problems and application to procurement auctions. *IEEE Transactions on Automation Science and Engin*
- N. Ramasuri and Y. Narahari. Determining Top K nodes in social networks using the Shapley Value. *Proceedings of AAMAS 2008*.
- Sujit Gujar and Y. Narahari. Redistribution of VCG payments in assignment of heterogeneous objects. *Proceedings of WINE 2008*.
- Y. Narahari and Sujit Gujar. Auctions for Electronic Commerce. Invited Book Chapter in: *The Handbook of Technology Management*, John Wiley and Sons, 2009.
- Y. Narahari and Ramasuri Narayanam. Game Theory. Invited Book Chapter in: *The Handbook of Technology Management*, John Wiley and Sons, 2009.

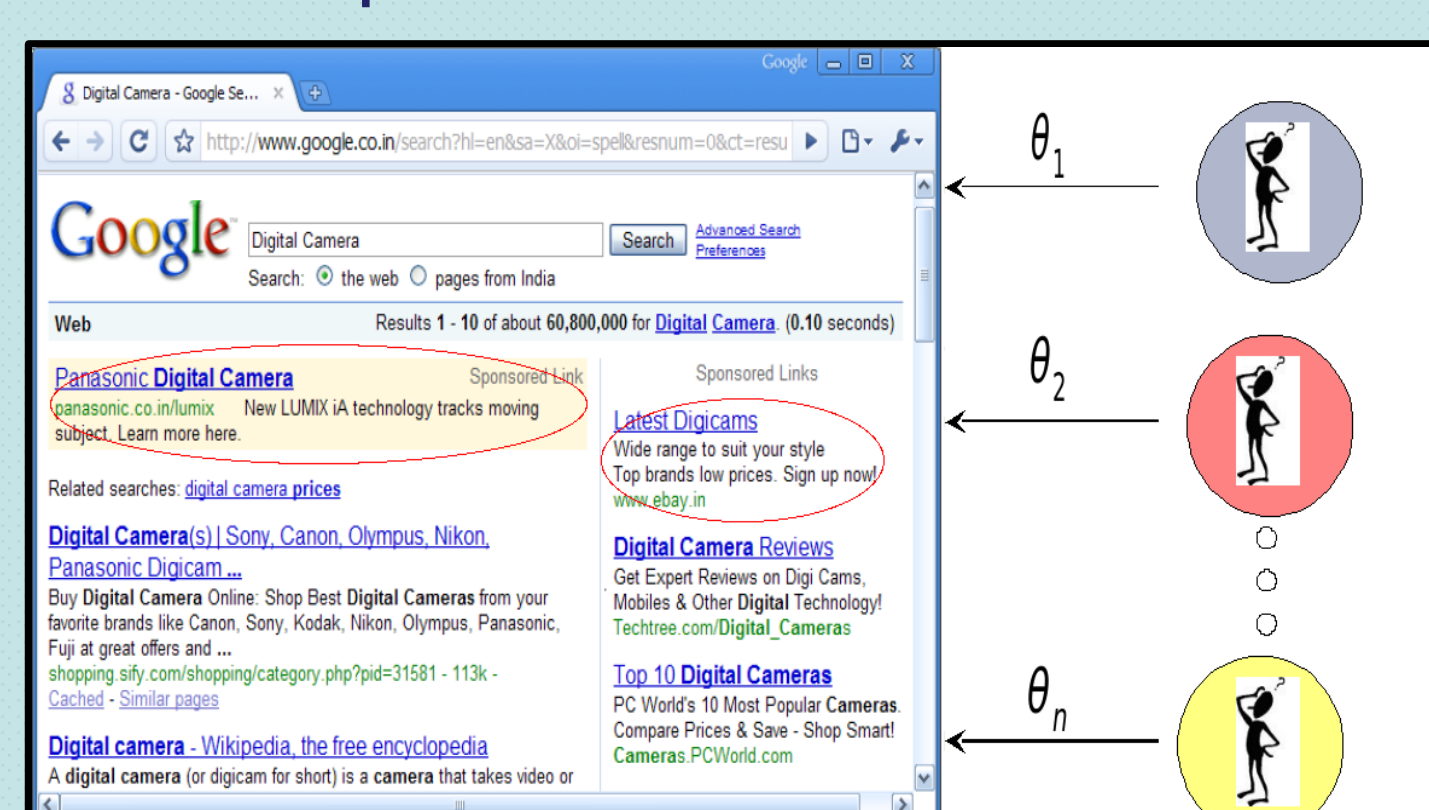
Recent Collaborations

- **GM R & D**: Procurement Auctions and Procurement Network Formation, 2002-07
- **ONR**: Mechanism Design for Complex Networks, 2007-09
- **Infosys**: Combinatorial Auctions for Web Service Composition, 2008
- **Infosys**: Algorithms for Carbon Trading, 2009-10
- **IBM**: Mechanism Design for Ticket Allocation in Software Maintenance, 2005-07
- **IBM**: Cooperative Approach to Bid Optimization in Sponsored Search, 2006-08
- **Xerox**: Incentive Compatible Learning

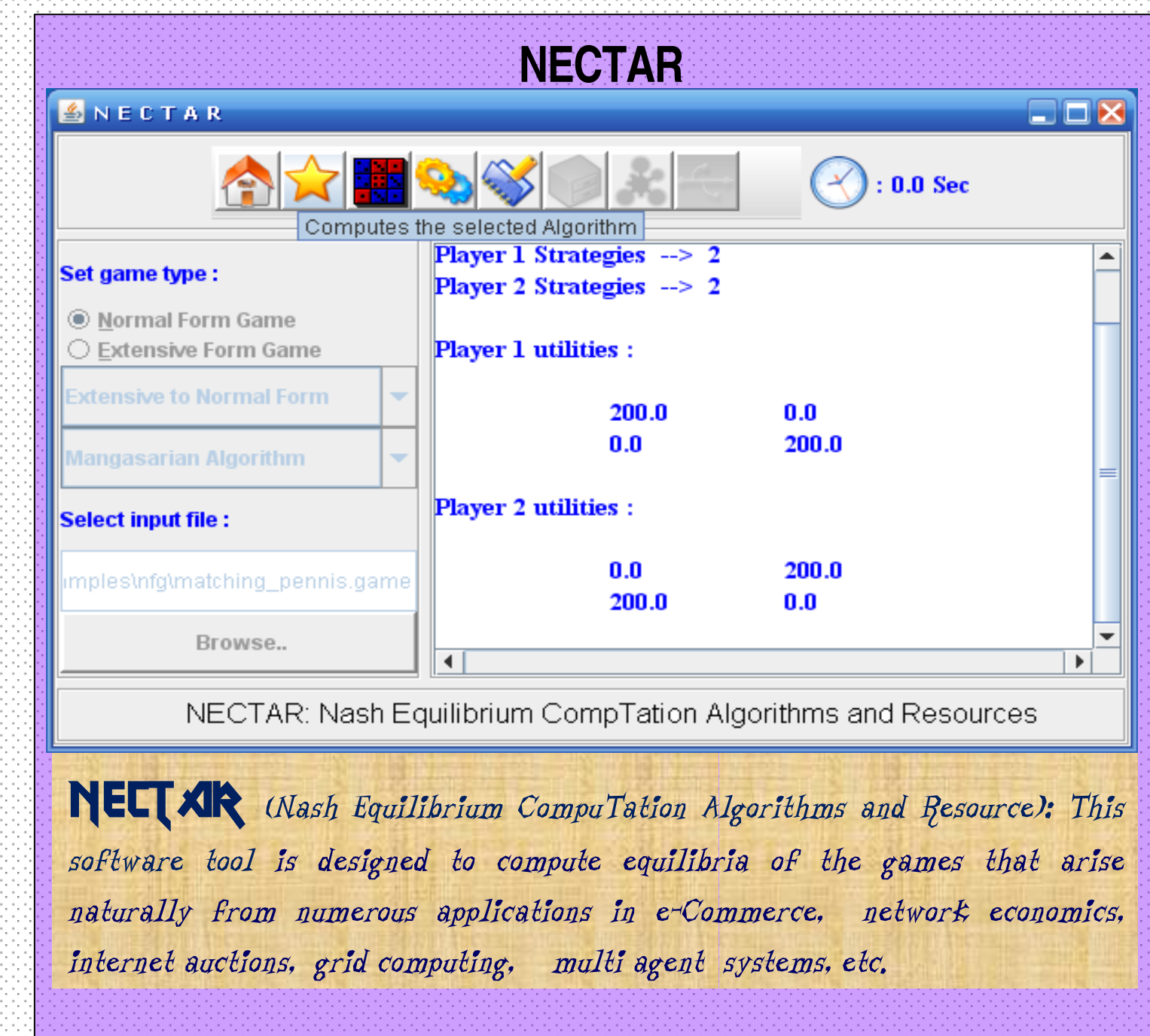


The focus of this book is to explore game theoretic modeling and mechanism design for problem solving in Internet and network economics. It provides a sound foundation of relevant concepts and theory, to help apply mechanism design to problem solving in a rigorous way.

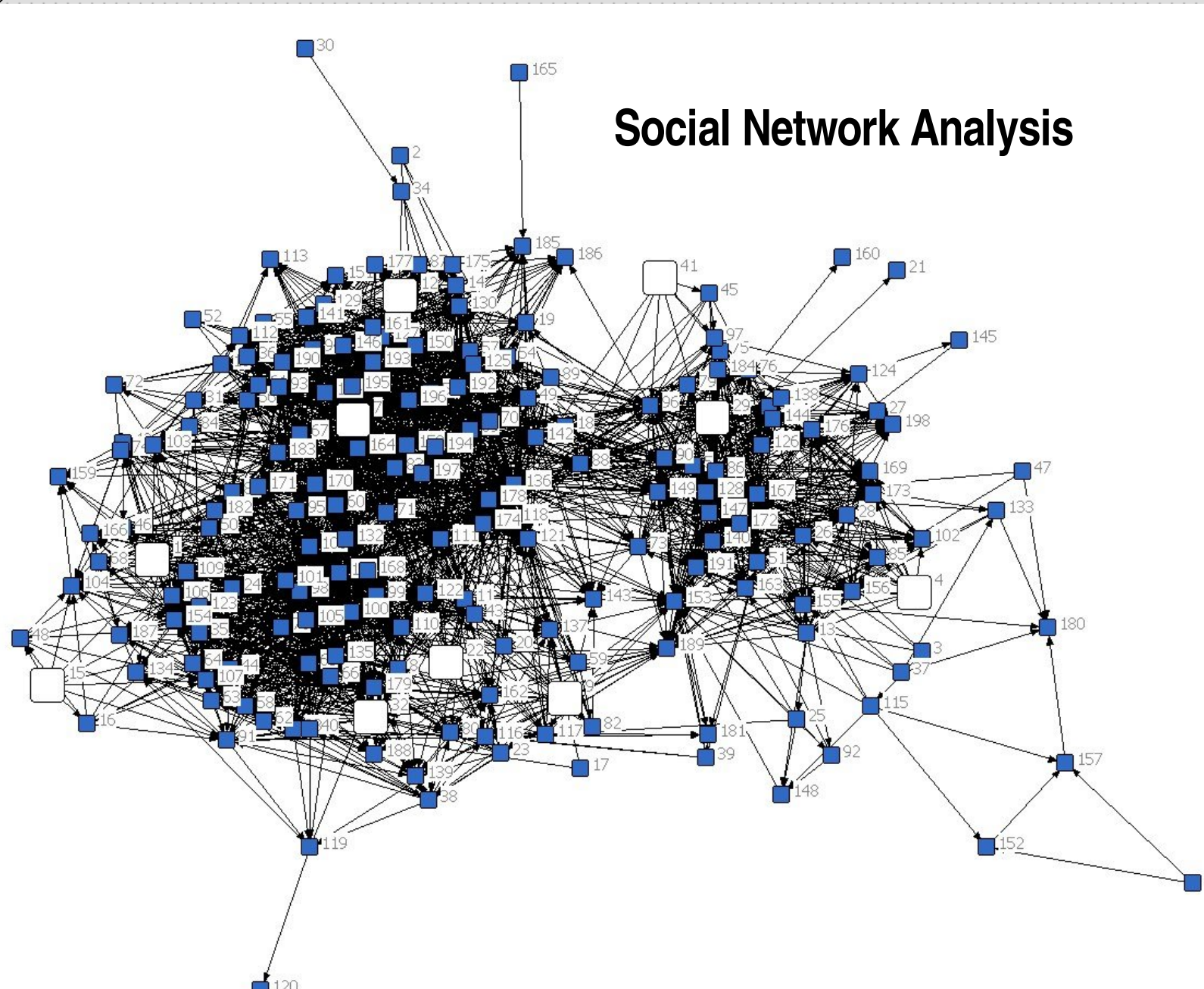
Sponsored Search Auctions



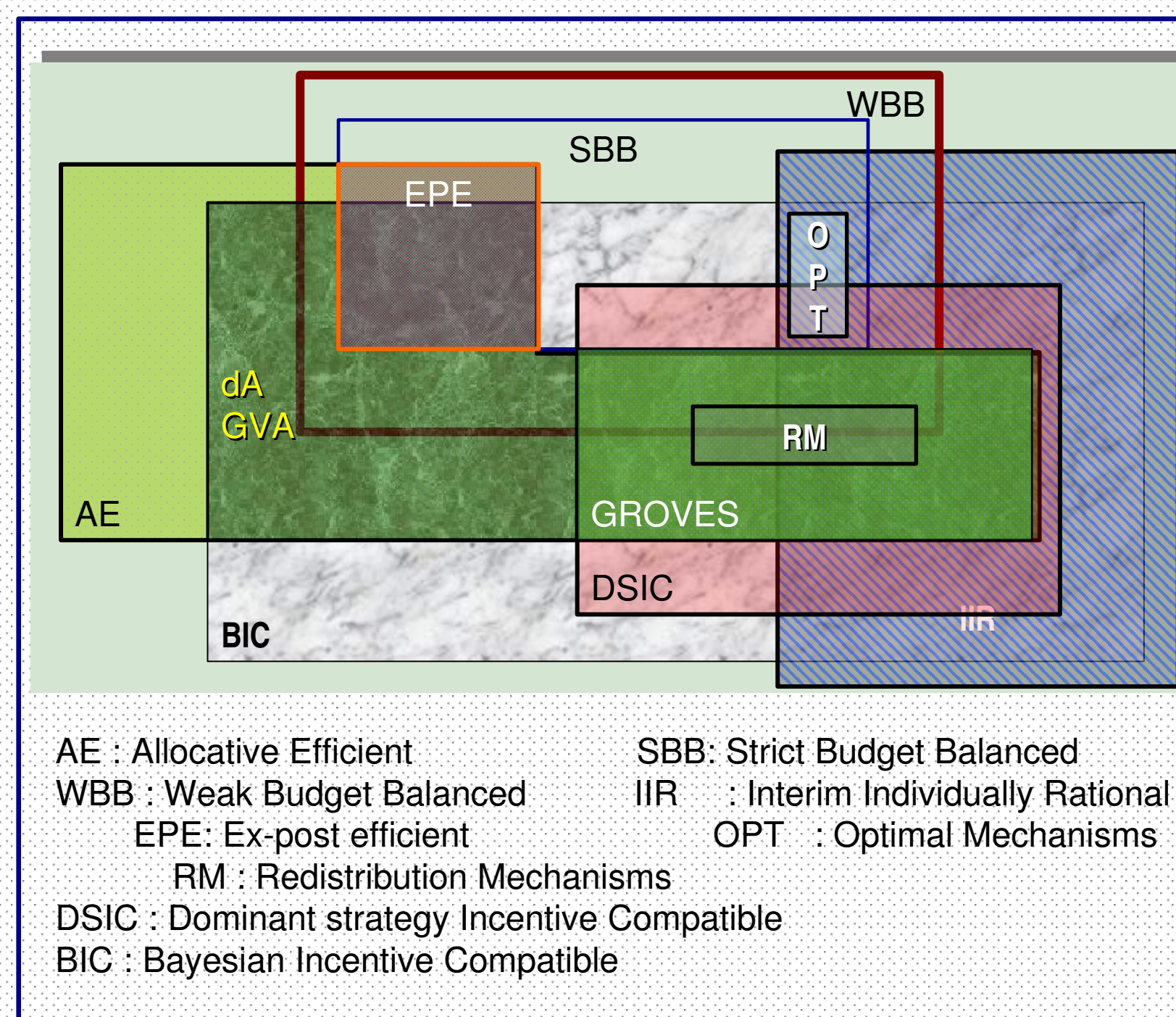
Our past research in this area had suggested optimal auctions for the search engine, the ongoing research in this area addresses the bid and budget optimization problems for the advertisers.



Social Network Analysis



- Game theoretic approach to determining top-k nodes for influence maximization problem in social networks
- Models of social network formation that considers all key determinants of network formation



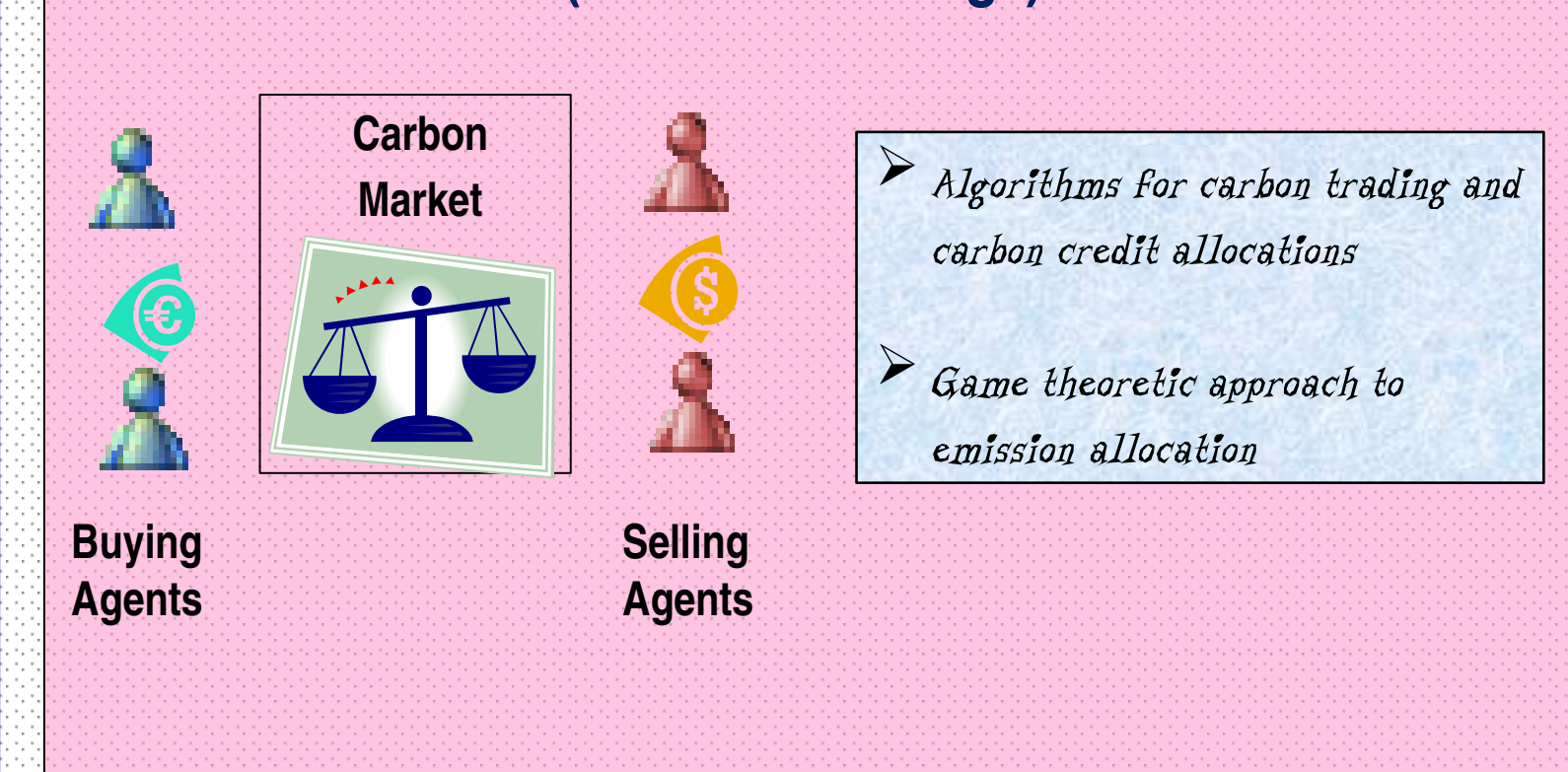
Optimal Auctions: Extensions to Myerson Auction

- ❖ Sponsored Search Auctions on the web
- ❖ Combinatorial Auctions with Single minded bidders
- ❖ Multi-unit procurement auctions

MECHANISM DESIGN

Designing mechanisms when agents possess multi-dimensional private information is a formidable challenge.
@ ECL we are involved in characterizing the mechanisms for various such scenarios.

Carbon Trading (Climate Exchange)



BEST THESIS AWARDS

- ✓ **Laaq Mohammad Khan.**
 - ❖ Performance Analysis of Scheduling Policies in Stochastic Re-Entrant Lines, February 1995. **Seshagiri Kaikini Medal** for Best Thesis with Industrial Application, IISc, 1995
- ✓ **Dinesh Garg**
 - ❖ F. Moudawala Medal for Best M.Sc. (Engineering) Dissertation in the Division of Electrical Sciences, 2003
 - ❖ Design of Innovative Mechanisms for Contemporary Game Theoretic Problems. Alumni Award for Best Thesis in the Department of CSA, 2006.
- ✓ **Pankaj Dayama**
 - ❖ F. Moudawala Medal for Best M.Sc. (Engineering) Dissertation in the Division of Electrical Sciences, 2005



Achievements

BEST PAPER AWARDS

- ✓ Best Application Paper Award for 2004, IEEE Transactions in Automation Science and Engineering, "**Design of Six Sigma Supply Chains**" (Dinesh Garg, Y Narahari, N Viswanadham)
- ✓ Best Application Paper Award for 2008, IEEE Transactions in Automation Science and Engineering, "**A Theory of Mechanism Design for Single Leader Stackelberg Problems with Applications to Procurement Auctions**" (Dinesh Garg, Y Narahari)

BEST PRESENTATION AWARDS

- ✓ **S. Kameshwaran** received best Research Presentation award in IISc-IIT Research Students Symposium, IRISS 2002.
- ✓ **Dinesh Garg:**
 - ❖ Best Presentation Award in CSA Perspectives Seminars, January-April 2003
 - ❖ Best Research Presentation award in All India Management Research Students Symposium, COSMAR-2004, IISc.
 - ❖ IRISS 2004
- ✓ **Sujit Gujar** received best Presentation Award in CSA Perspectives Seminars, January- April 2007.

AWARDS FOR ALUMNI

- ✓ **Dinesh Garg:** INAE Young Engineer Award 2007
- ✓ **Pankaj Dayama:** Charles L. McCuen Award in 2005, 2006, and 2009 at General Motors R&D, Warren, MI, USA.

FELLOWSHIPS/ INTERNSHIPS

- ✓ **POST-DOCTORAL FELLOWSHIPS**
 - ❖ **C.V.L. Raju.** London School of Economics. 2004-2006
 - ❖ **S. Kameshwaran.** INRIA Fellowship, France. 2005-2006
- ✓ **RESEARCH FELLOWSHIPS**
 - ❖ **Shantanu Biswas:** IBM-India Research Labs Research Fellowship, 2001-04.
 - ❖ **S. Kameshwaran:** IBM-India Research Labs Research Fellowship, 2001-04.
 - ❖ **Dinesh Garg:** IBM-India Research Labs Research Fellowship, 2005
 - ❖ **Sujit Gujar:** Infosys Research Fellowship, 2007-2009
 - ❖ **Ramasuri Narayanam:** Microsoft Research India Fellowship, 2007-2010
- ✓ **INTERNSHIPS**
 - ❖ **Shantanu Biswas:** Bell Labs Research Internship, 2002.
 - ❖ **Dinesh Garg:** General Motors Research Internship, April-May 2003. Microsoft Research, Redmond, 2005.
 - ❖ **T.S. Chandrashekar:** General Motors Research Internship, April-May 2003.
 - ❖ **Ramasuri Narayanam :** IBM IRL Internship for May-July 2007
 - ❖ **Sujit Gujar:** Harvard University (May-July 2009)

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