

VITA
Varun Dutt

GENERAL INFORMATION

Associate Professor
School of Computing and Electrical Engineering
School of Humanities and Social Sciences
Indian Institute of Technology Mandi
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Web: <https://faculty.iitmandi.ac.in/~varun/>;
https://www.researchgate.net/profile/Varun_Dutt;
<https://scholar.google.com/citations?user=jly9u8AAAAAJ&hl=en>;

RESEARCH INTERESTS

- Artificial Intelligence and Cognitive Modeling (modeling human behavior in dynamic tasks through computer algorithms)
- Human-Computer Interaction (study of the interaction between people and computers)
- Situation Awareness (recognition, comprehension, and projection of a situation in the decision environment)
Judgment and Decision Making (understanding human behavior in problems involving risk and uncertainty)
- Environmental Decision Making (understanding human behavior in environmental problems)

ACADEMIC TRAINING

| | | |
|----------------|---|------|
| Graduate: | Ph.D., Engineering and Public Policy, Carnegie Mellon, USA | 2011 |
| | M.S., Engineering and Public Policy, Carnegie Mellon, USA | 2010 |
| | M.S., Software Engineering, Carnegie Mellon, USA | 2006 |
| Undergraduate: | B. E., Computer Science and Engineering, Thapar University, India | 2004 |

SKILLS

I am currently working as an Associate Professor in the School of Computing and Electrical Engineering and School of Humanities and Social Sciences at Indian Institute of Technology Mandi. I am applying my knowledge and skills in the fields of computer science, psychology, and public policy to explore how humans make decisions on social, managerial, and environmental issues. My Ph.D. thesis focused on answering the question *why do we want to defer actions on climate change*, and I have investigated the question by applying literature on people's risk-preferences, time-preferences, social-cultural dilemmas, and linear thinking. I have used lab-based methods involving human participants and cognitive models to investigate my research questions.

In addition to my thesis research, I have investigated how people explore and exploit alternatives and make decisions from experience in risk and uncertainty at both individual and group levels. For this investigation, I have created human factors and cognitive models of human behavior using principles of instance-based learning, reinforcement learning, and Bayesian learning theories. The typical approach I have followed has focused on model creation, prediction, validation by running lab-based experiments, and further model generalization or model cross-validation in novel task situations.

ACADEMIC RESEARCH EXPERIENCE

| INSTITUTION | POSITION | DATES |
|---|-----------------------------|----------------------|
| School of Computing and Electrical Engineering and School of Humanities and Social Sciences, Indian Institute of Technology, Mandi, India | Associate Professor | April 2019 – Present |
| School of Computing and Electrical Engineering and School of Humanities and Social Sciences, Indian Institute of Technology, Mandi, India | Assistant Professor | June 2012 – Mar 2019 |
| Dynamic Decision Making Lab, Carnegie Mellon, Pittsburgh, PA, USA | Post-doctoral Fellow | Aug 2011 – May 2012 |
| Dynamic Decision Making Lab, Carnegie Mellon, Pittsburgh, PA, USA | Graduate Research Assistant | Aug 2007 – Aug 2011 |

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Dynamic Decision Making Lab, Carnegie Mellon,
Pittsburgh, PA, USA

Research Programmer

May 2006 – Jul 2007

TEACHING EXPERIENCE

| COURSE | DATES |
|---|---|
| <i>Assistant/Associate Professor, Indian Institute of Technology Mandi, India</i> | |
| IC 252: Data Science 2 | Feb 2019, Feb 2020 |
| IC 272: Data Science 3 | Aug 2019, Aug 2020 |
| CS 202: Data Structures and Algorithms | Aug 2020 |
| HS523: Decision-making for Social Change | Feb 2019, Feb 2020 |
| IC 201P: Prototype Development | Feb 2019, Feb 2013, Feb 2014, Feb 2020 |
| HS 528: Information Technology and Development | Aug 2018, Aug 2019, Aug 2020 |
| CS 207: Applied Database Practicum | Aug 2018, Aug 2019 |
| 5-Week Induction Program | Aug, 2017, Aug 2018, Aug 2019 |
| IC 250: Programming and Data Structure Practicum | Feb 2018 |
| CS 606: Computational Modeling of Social Systems | Feb 2019, Feb 2018, Feb 2017 |
| RM 600 Research Methodology | Aug 2020 |
| HS 616: Managerial Thinking and Decision Making | Aug 2014, Aug 2015, Feb 2018 |
| CS 660: Data Mining for Decision Making | Aug 2015, Feb 2017, Aug 2018 |
| EM 604: Energy: Environment Policy and Law | Feb 2015, Aug 2015, Feb 2016 Aug 2017 |
| CS 303: Software Engineering | Aug 2012, Aug 2013, Aug 2014 |
| IC 150P: Computation for Engineers Lab | Feb 2013, Aug 2014 |
| DP 301P: Interactive Socio-Technical Practicum | Feb 2014, Feb 2016, Feb 2017, Feb 2018, Feb 2019, Feb 2020 |
| CS 506: Cognitive Modeling | Feb 2013, Feb 2014, Feb 2016 |
| CS 308: Large-Scale Applications Practicum | Feb 2014, Feb 2015, Feb 2016, Aug 2016 |
| CS 208: Mathematical Foundations of Computer Science | Aug 2013 |
| HS 301: Public Policy and Advocacy Skills Engineering | Aug 2013 |
| IC 100: Reverse Engineering | Aug 2013 |
| CS-603: Managerial Decision Making | Aug 2012 |
| <i>Graduate Teaching Assistant, Carnegie Mellon University, Pittsburgh, PA</i> | |
| 88-431: Dynamic Decision Making | May 2007 - Jul 2007 |
| 19-752: EPP Project Management | Jan 2010 - May 2010 |
| 05-775: Cognitive Perspective in HCI | Jan 2010 - Feb 2010 |

ACADEMIC ADMINISTRATIVE EXPERIENCE

| Institution | Position | Date |
|---|---|---------------------|
| Indian Institute of Technology Mandi, India | Advisor, WING (Website) | Feb 2020 – Present |
| Indian Institute of Technology Mandi, India | Lead Coordinator, TIH (HCI) | May 2020 – Present |
| Indian Institute of Technology Mandi, India | Advisor, Alumni Affairs Cell | Feb 2020 – Present |
| Indian Institute of Technology Mandi, India | Advisor, Training and Placement Cell | Nov 2018 – Feb 2020 |
| Indian Institute of Technology Mandi, India | Associate Dean, International Relations | Aug 2015 – Apr 2020 |
| Indian Institute of Technology Mandi, India | SCEE Member, Senate | Nov 2012 – Apr 2020 |
| Indian Institute of Technology Mandi, India | Chief Warden | Feb 2015 – Nov 2017 |
| Indian Institute of Technology Mandi, India | Faculty Advisor, B. Tech. Students | Aug 2012 – Aug 2016 |
| Indian Institute of Technology Mandi, India | Member, SHSS Purchases | Jan 2013 – Aug 2016 |
| Indian Institute of Technology Mandi, India | Co-Advisor, International Relations | Aug 2012 – Aug 2015 |
| Indian Institute of Technology Mandi, India | Advisor, Recruitment Cell | Jan 2013 – Aug 2015 |
| Indian Institute of Technology Mandi, India | Member, SCEE Purchases | Jan 2013 – Feb 2014 |
| Indian Institute of Technology Mandi, India | Warden, Nako Hostel | May 2014 – Feb 2015 |

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|---|-----------------------------------|---------------------|
| Indian Institute of Technology Mandi, India | Asst. Warden, Nako Hostel | Aug 2012 – Feb 2014 |
| Indian Institute of Technology Mandi, India | Member of Editorial Team, SCRI | Aug 2012 – Dec 2012 |
| Indian Institute of Technology Mandi, India | Advisor, Programming Club | Aug 2012 – Dec 2012 |
| Indian Institute of Technology Mandi, India | Coordinator, Design Practicum | Jan 2013 – Jun 2013 |
| Indian Institute of Technology Mandi, India | Member, Course Proposal Committee | Jan 2013 – Sep 2013 |

PROFESSIONAL EXPERIENCE

| INSTITUTION | POSITION | DATES |
|--|--------------------------------|---------------------|
| Intiot Services Pvt. Ltd., India | Founder and Executive Director | Apr 2019 - Present |
| RxDataScience Inc., NY, USA | Board of Governor | Jan 2018 - Present |
| Intergovernmental Panel on Climate Change (IPCC) | Lead Author (Chapter 2) | Nov 2012 – Mar 2014 |
| Newspaper Financial Chronicle, Inc., India | Knowledge Editor | Dec 2008 – Aug 2018 |
| Newspaper Economic Times, Inc., India | Freelance Journalist | Aug 2006 – Aug 2007 |
| Messenger Service Inc., Pittsburgh, PA, USA | Software Engineer | Aug 2006 - Sep 2006 |
| Tata Consultancy Services (TCS), India | Software Engineer | Feb 2005 - Jun 2005 |
| MotherSumi Infotech and Designs Ltd. | Software Engineer | Aug 2004 - Jan 2005 |

PROJECTS

1. Why do people exhibit a lack of Understanding about Earth's Climate? Influence of Repeated Feedback, IITM/SG/VD/32, INR 5 lakhs, IIT Mandi, Sep 2014 – Sep 2017
2. Building a Secure and Trustworthy Cyberspace: A Behavioral Game-Theoretic Approach, IITM/DST/VD/64, INR 23 lakhs, DST, Dec 2014 – Dec 2017
3. Machine Learning and Data Mining for Sales and Analytics in Pharma, IITM/CONS/PPLP/VD/03, INR 60 lakhs, Purdue Pharma L.P. USA, Feb 2015 – Feb 2018
4. Visvesvaraya PhD Scheme for Electronics & IT in 2014-15, IITM/DeitY-MLA/ASO/93, INR 217 lakhs, DeitY-MLA, Aug 2015 – Present
5. Decisions from experience: AN ERP investigation of decision based on valuation of outcomes and probabilities, IITM/DST/DB/89, INR 18.6 lakhs, DST, Aug 2015 – Oct 2017 (Mentor: Dr. Varun Dutt)
6. Visualization of Big Data in Pharma, IITM/CONS/PPLP/VD/05, INR 6 lakhs, Purdue Pharma, L.P., USA, Aug 2015 – June 2016
7. Development of human-performance modeling framework via physiological and signal processing tools for visual cognitive enhancement in IVD, VR and AR paradigms, IITM/DRDO-CARS/VD/110, INR 22 lakhs, DRDO, Jun 2016 – Jun 2019
8. Efficient query and visualization of Big Data, IITM/CONS/RxDSI/VD/07, INR 6.5 lakhs, Rx Data Science Inc., USA, Sep 2016 – Jun 2017
9. Development and evaluation of landslide risk communication solutions in Mandi District of H.P., IITM/HPSCSTE/VD/130, INR 5.14 lakhs, Himachal Pradesh State council for Science, Technology & Environment (SCSTE), Nov 2016 – Nov 2018
10. Design and Development of a Smart Seat-Belt Monitoring System, INR 10.5 lakhs, HE India, Feb 2017 – Feb 2019
11. Application for mining rare diseases and analyzing and predicting patient journeys, IITM/CONS/RxDSI/VD/16, US \$21,667, RxDataScience Inc., USA, Nov 2018 - Aug 2019
12. Development and evaluation of low-cost landslide early warning solutions, IITM/DRDO-DTRL/VD/179, INR 10 lakhs, DRDO-DTRL, Oct 2017 – Oct 2020
13. Development and evaluation of low-cost landslide monitoring solutions, IITM/NDMA/VD/184, NDMA, INR 27.8 lakhs, Dec 2017 – Dec 2020
14. Design of Advanced Big Data Analytics in the CygNet Management System for large telecom networks, IITM/MHRD(UAY)/AD/115, MHRD, INR 140 lakhs, Jun 2016 – Jun 2020 (Co-PI)
15. A Game Theoretic Approach involving Experimentation and Computational Modeling using Deception in Cyber Security, Department of Science and Technology (ICPS), INR 60 lakhs, Feb 2019 – Feb 2022
16. Public Perception of Air Pollution and development and testing of a low-cost Air Pollution Sensing and Warning System, IITM/DEST-HP/VD/240, INR 7,00,000, Department of Environment, Science and Technology, Shimla, Himachal Pradesh, May 2019 – May 2021

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17. Deployment of sensors for landslide monitoring and early warning, Deputy Commissioner Mandi (H.P.), IITM/DCoM/VD/204, INR 3,00,000, Jun 2018 – Jun 2021
18. Development and Deployment of low-cost landslide monitoring and warning system in district Sirmaur (H.P.), Deputy Commissioner Sirmaur (H.P.), IITM/DC-SIR/VD/226, INR 4,00,000, Jan 2019 – Jan 2020
19. Evaluation of quantitative systems pharmacology and machine learning models for blood glucose prediction, IITM/CONS/RxDSI/VD/33, RxDataScience Inc., USA, INR 15,26,400, Aug 2019 – Feb 2022
20. UKIERI – DST international workshop on adversarial cybersecurity, IITM/WS/VD/79, UKIERI – DST, INR 1,56,700, Sep 2020 – Oct 2020
21. Human Performance enhancement via tDCS in VR and performance forecasting via machine learning methods, ITM/DRDO-LSRB/VD/301, Life Sciences Research Board, DRDO, INR 49,13,480, Dec 2020 – Dec 2023
22. A low-cost MEMS-based and video-based monitoring and early warning system for rainfall-induced landslides, IITM/DST/VKU/300, INR 40 lakhs, IIT Mandi, Dec 2020 – Dec 2023 (Co-PI)
23. Technology Innovation Hub (HCI), DST, NM-ICPS, INR 110,00,000, Dec 2020 – Dec 2025 (Lead coordinator)

SCHOLARSHIPS AND FELLOWSHIPS

| INSTITUTION | NAME | DATES |
|--|--|---------------------|
| Carnegie Mellon University | Visiting Faculty, Social and Decision Sciences | Dec 2013 – Jan 2014 |
| Max Planck Institute for Human Development | Summer Institute on Bounded Rationality | Jul 2009 – Aug 2009 |
| Carnegie Mellon University | Steinbrenner Fellowship | Aug 2008 – Aug 2009 |
| Carnegie Mellon University | Dean's Fellowship | Aug 2007 - May 2008 |
| Carnegie Mellon University | ACT-R Summer School | Jul 2007 – Aug 2007 |
| Thapar University | Tuition Fellowship (1 st in Branch) | Aug 2000 – Aug 2001 |

BOOK PUBLICATIONS

Dutt, V. (2011). *Why do we want to defer actions on climate change? A psychological perspective* (Doctoral dissertation). Carnegie Mellon University. Pittsburgh, PA, USA.

JOURNAL PUBLICATIONS

Chaturvedi, P., & **Dutt, V.** (in press). Understanding Human Decision-Making in an Interactive Landslide Simulator Tool via Reinforcement Learning. *Frontiers in Psychology*.

Aggarwal, P., Moisan, F., Gonzalez, C., & **Dutt, V.** (in press). Learning About the Effects of Alert Uncertainty in Attack and Defend Decisions via Cognitive Modeling. *Human Factors*.

Pathania, A., Kumar, P., Priyanka., Maurya, A., Uday, K. V., & **Dutt, V.** (in press) Development of an Ensemble Gradient Boosting Algorithm for Generating Alerts about impending Soil Movements. In Workshop on Machine learning, Deep learning, and Computational Intelligence for wireless communication. *Lecture Notes in Electrical Engineering*.

Pathania, A., Kumar, P., Priyanka, A. M., Kumar, M., Singh, R., Chaturvedi, P., & **Dutt, V.** (in press). Predictions of soil movements using Persistence, Auto-regression, and Neural network models: A case-study in Mandi, India. *International Journal of Swarm Intelligence*.

Rao, A. K., Chandra, S., & **Dutt, V.** (2020). Desktop and Virtual-Reality Training Under Varying Degrees of Task Difficulty in a Complex Search-and-Shoot Scenario. *Lecture Notes in Computer Science*, 12428, 421–439. https://doi.org/10.1007/978-3-030-59990-4_31

Agarwal, K., Uniyal, P., Virendrasingh, S., Krishna, S., & **Dutt, V.** (2020). Spam Mail Classification Using Ensemble and Non-Ensemble Machine Learning Algorithms. *Lecture Notes in Networks and Systems*, 141, 179-189.

Katakwar, H., Aggarwal, P., Maqbool, Z., & **Dutt, V.** (2020). Influence of Network Size on Adversarial Decisions in a Deception Game Involving Honeypots. *Frontiers in Psychology*, 11, 2385.

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- Tyagi, R., Aggarwal, P., Mohanty, M., **Dutt, V.**, & Anand, A. (2020). Computational cognitive modeling and validation of Dp140 induced alteration of working memory in Duchenne Muscular Dystrophy. *Nature Scientific Reports*, *10*(1), 1-12.
- Kumar, M., & **Dutt, V.** (2020). Understanding Decisions in Collective Risk Social Dilemma Games Using Reinforcement Learning. *IEEE Transactions on Cognitive and Developmental Systems*, *12*(4), 824-840.
- Kaushik, S., Choudhury, A., Natarajan, S., Pickett, L. A., & **Dutt, V.** (2020). Medicine expenditure prediction via a variance-based generative adversarial network. *IEEE Access*, *8*, 110947-110958.
- Aggarwal, P., & **Dutt, V.** (2020). The role of information about opponent's actions and intrusion-detection alerts on cyber decisions in cyber security games. *Cyber Security: A Peer-Reviewed Journal*, *3*(4), 363-378.
- Kaushik, S., Choudhury, A., Sheron, K.P., Sayee, N.D., Larry A. P., & **Dutt V.** (2020). AI in healthcare: time-series forecasting using statistical, neural, and ensemble architectures. *Frontiers in Big Data*, *3*(4).
- Maqbool, Z., Aggarwal, P., Pammi, V. C., & **Dutt, V.** (2020). Cyber Security: Effects of Penalizing Defenders in Cyber-Security Games via Experimentation and Computational Modeling. *Frontiers in Psychology*, *11* (11).
- Sangar, S., **Dutt, V.**, & Thakur, R. (2020). Coping with out-of-pocket health expenditure in India: evidence from NSS 71st round. *Global Social Welfare*, *7*(3), 275-284.
- Maqbool, Z., & **Dutt, V.** (2019). Behavioural Cybersecurity: Investigating the influence of patching vulnerabilities on cyber decision-making via cognitive modeling. *Journal of Cyber Situation Awareness*, *4*(1), 185-209.
- Kumar, M., & **Dutt, V.** (2019). Alleviating misconceptions about Earth's climate: evidence of behavioral learning in stock-and-flow simulations. *System Dynamics Review*, *34*(4), 503-526.
- Sangar, S., **Dutt, V.**, & Thakur, R. (2019). Comparative Assessment of Economic Burden of Disease in Relation to Out of Pocket Expenditure. *Frontiers in Public Health*, *7*.
- Sangar, S., **Dutt, V.**, & Thakur, R. (2019). Distress financing of out-of-pocket health expenditure in India. *Review of Development Economics*, *23*(1), 314-330.
- Aggarwal, P., Moisan, F., Gonzalez, C., & **Dutt, V.** (2018). Understanding Cyber Situational Awareness in a Cyber Security Game Involving Recommendations. *International Journal of Cyber Situational Awareness*, *3*(1), 1-29.
- Choudhury, A., Kaushik, S., & **Dutt, V.** (2018). Social-network analysis in healthcare: analysing the effect of weighted influence in physician networks. *Network Modeling Analysis in Health Informatics and Bioinformatics*, *7*(1), 17.
- Chaturvedi, P., Arora, A., & **Dutt, V.** (2018). Learning in an interactive simulation tool against landslide risks: the role of strength and availability of experiential feedback. *Natural Hazards and Earth System Sciences*, *18*(6), 1599-1616.
- Sangar, S., **Dutt, V.**, & Thakur, R. (2018). Economic burden, impoverishment and coping mechanisms associated with out -of-pocket health expenditure: analysis of rural-urban differentials in India. *Journal of Public Health*, 1-10.
- Sangar, S., **Dutt, V.**, & Thakur, R. (2018). Rural–urban differentials in out-of-pocket health expenditure and resultant impoverishment in India: evidence from NSSO 71st Round. *Asia-Pacific Journal of Regional Science*, *3*, 273–291.
- Sharma, N., Debnath, S., & **Dutt, V.** (2018). Influence of an intermediate option on the description- experience gap and information search. *Frontiers in Psychology*, *9*, 364.
- Kumar, M., & **Dutt, V.** (2018). Experience in a Climate Microworld: Influence of Surface and Structure Learning, Problem Difficulty, and Decision Aids in Reducing Stock-Flow Misconceptions. *Frontiers in Psychology*, *9*, 299.

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- Chaturvedi, P., Arora, A., & **Dutt, V.** (2017). Learning in an Interactive Simulation Tool against Landslide Risks: The Role of Amount and Availability of Experiential Feedback, *Natural Hazards and Earth System Sciences Discussion*, DOI:10.5194/nhess-2017-297.
- Sharma, G., Kaushal, Y., Chandra, S., Singh, V., Mittal, A. P., & **Dutt, V.** (2017). Influence of Landmarks on Wayfinding and Brain Connectivity in Immersive Virtual Reality Environment. *Frontiers in Psychology*, 8, 1220.
- Sharma, N., & **Dutt, V.** (2017). Modeling decisions from experience: How models with a set of parameters for aggregate choices explain individual choices. *Journal of Dynamic Decision Making*, 3(3).
- Maqbool, Z., Makhijani, N., Pammi, V. C., & **Dutt, V.** (2017). Effects of Motivation: Rewarding Hackers for Undetected Attacks Cause Analysts to Perform Poorly. *Human Factors*, 59(3), 420-431.
- Kaushik, S., Choudhury, A., Mallik, K., Moid, A., & **Dutt, V.** (2016). Applying Data Mining to Healthcare: A Study of Social Network of Physicians and Patient Journeys. *Lecture Notes in Computer Science*, 9729, 599-613.
- Gonzalez, C., & **Dutt, V.** (2016). Exploration and maximization during information search and experimental choice. *Journal of Dynamic Decision Making*, 2(2), 1-8.
- Biswas, P., **Dutt, V.**, & Langdon, P. (2016). Comparing Ocular Parameters for Cognitive Load Measurement in Eye-gaze Controlled Interfaces for Automotive and Desktop Computing Environments. *International Journal of Human-Computer Interaction*, 32 (1), 23-38.
- Dutt, V.**, & Gonzalez, C. (2015). Accounting for outcome and process measures in dynamic decision-making tasks through model calibration. *Journal of Dynamic Decision Making*, 1(1).
- Gonzalez, C., Ben-Asher, N., Martin, J. M., & **Dutt, V.** (2015). A cognitive model of dynamic cooperation with varied interdependency information. *Cognitive Science*, 39(3), 457-495.
- Dutt, V.**, Arlo-Costa, H., Helzner, J., & Gonzalez, C. (2014). The Description-Experience Gap in Risky and Ambiguous Gambles. *Journal of Behavioral Decision Making*, 27(4), 316-327.
- Mehlhorn, K., Ben-Asher, N., **Dutt, V.**, & Gonzalez, C. (2014). Observed Variability and Values Matter Towards a Better Understanding of Information Search and Decisions from Experience. *Journal of Behavioral Decision Making*, 27(4), 328– 339.
- Debnath, S., Baishya, S. S., Triebel, R., **Dutt, V.**, Cremers, D. (2014). Environment-Adaptive Learning: How Clustering Helps to Obtain Good Training Data. *Lecture Notes in Computer Science*, 8736, pp 68-79. doi: 10.1007/2F978-3-319-11206-0_8
- Kumar, A., Prakash, J., **Dutt, V.** (2014). Understanding Human Driving Behavior through Computational Cognitive Modeling. *Lecture Notes in Computer Science*, 8662, pp 56-65. doi: 10.1007/978-3-319-11167-4_6
- Dutt, V.**, & Kaur, A. (2013). Cyber Security: Testing the Effects of Attack Strategy, Similarity, and Experience on Cyber Attack Detection. *International Journal of Trust Management in Computing and Communications*, 1(3/4), 261-273. doi: 10.1504/IJTMCC.2013.056428
- Dutt, V.**, Young-Suk, A., & Gonzalez, C. (2013). Cyber Situation Awareness: Modeling the Detection of Cyber Attacks with Instance-based Learning Theory. *Human Factors*, 55(3), 605-618. doi: 10.1177/0018720812464045
- Proctor, R.W., Yamaguchi, M., **Dutt, V.**, & Gonzalez, C. (2013). Dissociation of S-R Compatibility and Simon Effects with Mixed Tasks and Mappings. *Journal of Experimental Psychology: Human Perception and Performance*, 39(2), 593-609. doi: 10.1037/a0029923
- Gonzalez, C., **Dutt, V.**, & Lebiere, C. (2013). Validating Instance-Based Learning Mechanisms Outside of ACT-R. *Journal of Computational Science*, 4(4), 262–268. doi: 10.1016/j.jocs.2011.12.001

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- Dutt, V.,** & Gonzalez, C. (2013). Enabling eco-friendly choices by relying on the proportional-thinking heuristic. *Sustainability, 5*(1), 357-371. doi: 10.3390/su5010357
- Dutt, V.,** & Gonzalez, C. (2013). Reducing the Linear Perception of Non-Linearity: Use of a Physical Representation. *Journal of Behavioral Decision Making, 26*(1), 51–67. 10.1002/bdm.759
- Gonzalez, C., & **Dutt, V.** (2012). Data Aggregation and "Ensuing Problems for the IBL Model": A reply to Hills and Hertwig (2012). *Psychological Review, 119*(4), 893-898.
- Dutt, V.** & Gonzalez, C. (2012). Making Instance-based Learning Theory Usable and Understandable: The Instance-based Learning Tool. *Computers in Human Behavior, 28*(4), 1227–1240. doi: 10.1016/j.chb.2012.02.006
- Dutt, V.** & Gonzalez, C. (2012). The role of inertia in modeling decisions from experience with instance-based learning. *Frontiers in Psychology, 177*(3), 1-12. doi: 10.3389/fpsyg.2012.00177
- Dutt, V.** & Gonzalez, C. (2012). Decisions from experience reduce misconceptions about climate change. *Journal of Environment Psychology, 32*(1), 19-29. doi: 10.1016/j.jenvp.2011.10.003
- Dutt, V.** & Gonzalez, C. (2011). Human Control of Climate. *Climatic Change, 111*(3-4), 497-518. doi: 10.1007/s10584-011-0202-x
- Dutt, V.** (2011). Explaining Human Behavior in Dynamic Tasks through Reinforcement Learning. *Journal of Advances in Information Technology, 2*(3), 177-188. doi:10.4304/jait.2.3.177-188
- Dutt, V.,** Young-Suk, A., & Gonzalez, C. (2011). Cyber Situation Awareness: Modeling the Security Analyst in a Cyber-Attack Scenario through Instance-Based Learning. *Lecture Notes in Computer Science, 6818*, 280-292. doi: 10.1007/978-3-642-22348-8_24
- Dutt, V.,** & Gonzalez, C. (2011). Why do we want to delay actions on climate change? Effects of probability and timing of climate consequences. *Journal of Behavioral Decision Making, 25*, 154-164. doi: 10.1002/bdm.721
- Gonzalez, C. & **Dutt, V.** (2011). Instance-based Learning: Integrating Sampling and Repeated Decisions from Experience. *Psychological Review, 118*(4), 523-551. doi: 10.1037/a0024558
- Gonzalez C., **Dutt V.,** & Lejarraga T. (2011). A Loser Can Be a Winner: Comparison of Two Instance-based Learning Models in a Market Entry Competition. *Games, 2*(1), 136-162. doi: 10.3390/g2010136
- Gonzalez, C., & **Dutt, V.** (2011). A Generic Dynamic Control Task for Behavioral Research and Education. *Computers in Human Behavior, 27*, 1904–1914. doi: 10.1016/j.chb.2011.04.015
- Lejarraga, T., **Dutt, V.,** & Gonzalez, C. (2010). Instance-based learning: A general model of repeated binary choice. *Journal of Behavioral Decision Making, 25*, 143-153. doi: 10.1002/bdm.722
- Young, M. D., Healy, A. F., Gonzalez, C., **Dutt, V.,** & Bourne, L. E. (2010). Effects of training with added difficulties on RADAR detection. *Applied Cognitive Psychology, 24*, 1-22. doi: 10.1002/acp.1706

PATENTS

- Dutt, V.,** Kala, U., Agarwal, S., Kumar, P., Pathania, A., Priyanka, & Mali, N. (2018). Smart IoT based test bed system for lab-scale landslide monitoring experiments, Patent Application 201813039735. Patent Office Pocket 1, Sector 14 Dwarka, New Delhi, Delhi – 110078, 22/10/2018.
- Dutt, V.,** Kala, U., Chaturvedi, P., Agarwal, S., Agarwal, K., & Mali, N. (2018). Low cost sensor-based system for landslide monitoring and alerts, Patent Application PCT/IN2018/050217. Geneva, Switzerland, 16/04/2018.
- Dutt, V.,** Chaturvedi, P., Agrawal, K., Agrawal, S., Mali, N., & Kala, U. (2017). Low-cost sensor-based system for landslide

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monitoring and alerts, Patent Application 201711045337. Patent Office, Pocket 1, Sector 14 Dwarka, New Delhi, Delhi - 110078, 18/12/2017.

Dutt, V., Chaturvedi, P., Saini, T., Kumar, P., Pathania, A., Rana, D.C. & Attri, S.C. (2019). Low-power, Low-cost Air-Quality Monitoring, Predicting & warning system, Patent Application 201911048755. New Delhi, Patent Office Dwarka New Delhi 110078, 28/11/2019.

BOOK CHAPTER PUBLICATIONS

Saini, T., Rana, D. C., Attri, S., Chaturvedi, P., & **Dutt, V.** (in press). Forecasting of air pollution via a low-cost IoT-based monitoring system. In Verma K.J., Saxena, D., and Gonzalez-Prida, D.V. (1st Eds.), *EAI/Springer Innovations in Communications and Computing IoT and Cloud for Societal Good*. Springer.

Saini, T., Tomar, G., Rana, D. C., Attri, S., Chaturvedi, P., & **Dutt, V.** (in press). CloudIoT for pollution monitoring: A multivariate weighted ensemble forecasting approach for prediction of suspended particulate matter. In Verma K.J., Saxena, D., Gonzalez-Prida, D.V., and Shendryk, V., (1st Eds.), *CloudIoT: Concepts, Paradigms and Applications*. CRC Press.

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Lejarraga, T., **Dutt, V.**, & Gonzalez, C. (2010). Instance-based Learning in Repeated Binary Choice. In Paper presented at the 31st Annual Conference of the Society for Judgment and Decision Making. St. Louis, MO, USA.

Gonzalez, C. & **Dutt, V.** (2010). Instance-based Learning: Integrating Decisions from Experience in Sampling and Repeated Choice Paradigms. In *Paper presented at 2010 Experience, heuristics, and choice: Prospects for bounded rationality workshop at Carnegie Mellon University*. Pittsburgh, PA, USA.

Arlo-Costa, H., Gonzalez, C., **Dutt, V.**, & Helzner, J. (2010). Decisions from Experience in Conditions of Uncertainty. In *Paper presented at 2010 Experience, heuristics, and choice: Prospects for bounded rationality workshop at Carnegie Mellon University*. Pittsburgh, PA, USA.

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Dutt, V., & Gonzalez, C. (2010). Physical Representation and Linear Thinking on Climate Change. In

Paper presented at the 2010 Society of Risk Analysis Annual Meeting. Salt Lake City, Utah, USA.

Gonzalez, C., & **Dutt, V.** (2010). Instance-based Learning Models of Training. In *Paper presented at the 54th Annual Meeting of the Human Factors and Ergonomics Society*. San Francisco, CA, USA.

Proctor R.W., Yamaguchi, M., Gonzalez, C., & **Dutt, V.** (2010). Spatial Compatibility Effects in a Complex Task Environment. In *Paper presented at the 2010 American Psychological Association Convention*. San Diego, CA, USA.

Walter, W., **Dutt, V.**, Gluck, K., & Reitter, D. (2010). Results and Lessons Learned from the 2009 DSF Modeling Comparison Challenge. In *Symposium presented at the 2010 Behavioral Representation in Modeling Simulation conference*. Charleston, SC, USA

Dutt, V., & Gonzalez, C. (2009). Human Control of Climate. In *Poster presented at the 2009 Summer Institute on Bounded Rationality*. Berlin, Germany.

Dutt, V., & Gonzalez, C. (2009). Climate Risk Communication: A Cure for People's Mental Models. In *Paper presented at the 2009 Society of Risk Analysis Annual Meeting*. Baltimore, MD.

Lebiere, C., Gonzalez, C., **Dutt, V.**, Warwick, W. (2009). Predicting cognitive performance in open-ended dynamic tasks a modeling comparison challenge. In *Symposium at 2009 9th International Conference on Cognitive Modeling*. Manchester: UK.

Gonzalez, C., **Dutt, V.**, Healy, A., Young, M. & Bourne, L. (2009). Comparison of instance and strategy models in ACT-R. In A. Howes, D. Peebles, R. Cooper (Eds.), *9th International Conference on Cognitive Modeling – ICCM2009*, Manchester, UK.

Dutt, V., Yamaguchi, M., Gonzalez, C., & Proctor, R. (2009). An Instance-Based Learning Model of Stimulus-Response Compatibility Effects in Mixed Location-Relevant and Location-Irrelevant Tasks. In *Poster presented at 2009 9th International Conference on Cognitive Modeling*. Manchester: UK.

Dutt, V., & Gonzalez, C. (2009). A Model of Human Perceptions of Climate Change. In *Paper presented at American Society for Engineering Education (ASEE) Spring 2009 Northeast Conference*. Bridgeport, CT.

Dutt, V., & Gonzalez, C. (2009). How do we perceive carbon-dioxide lifetimes? In *Paper presented at USSEE 2009 Conference*. Washington D.C., MD.

Dutt, V., & Gonzalez, C. (2009). Human "Mis"- perceptions of Climate Change. In *Paper presented at the HFES 53rd Annual Meeting*. San Antonio, TX.

Dutt, V., & Gonzalez, C. (2008). Human Perceptions of Climate Change. In *Paper presented at the 26th International Conference of the System Dynamics Society*. Athens, Greece.

Dutt, V., & Gonzalez, C. (2008). Human Perceptions of Climate Change. In *Paper presented at the 3rd Annual - Student Industrial Ecology Conference*, University of Pittsburgh – Benedum Hall, Kresge Auditorium Rm. 1175, Pittsburgh, PA.

Dutt, V., & Gonzalez, C. (2008). Human Perceptions of Climate Change. In *Paper presented at the 2008 American Psychological Association Convention's Symposium Decision Making in Dynamic and Complex Environments*. Boston, MA, USA.

Dutt, V., & Gonzalez, C. (2008). Instance and strategy based models in ACT- R. In *Proceedings of 2008 Modeling, Simulation & Gaming (MS&G) Student Capstone Conference* (pp. 19). Suffolk, VA: ODU-VMASC.

Dutt, V., & Gonzalez, C. (2008). Instance and Strategy ACT-R models of choice in a dynamic control task: a model comparison story. *Proceedings of 2008 Fifteenth Annual Workshop and Summer School* (pp. 43). Pittsburgh, PA: ACT-R RESEARCH GROUP.

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Varun Dutt

Dutt, V., & Gonzalez, C. (2008). Risk Perceptions of Climate Change. In *Paper presented at the 2008 Society of Risk Analysis Annual Meeting*. Boston, MA.

Young, M. D., Healy, A. F., Gonzalez, C., **Dutt, V.**, & Bourne, L. E., Jr. (2008). Effects of training with added relevant responses on RADAR detection. *The Experimental Psychology Society and the Psychonomic Society*, Chicago, IL.

Dutt, V., & Gonzalez, C. (2007). Slope of inflow impacts dynamic decision making. In *Paper presented at the 25th (2007) International Conference of the System Dynamics Society*. Boston, MA, USA.

Gonzalez, C., & **Dutt, V. (2007).** Learning to control a dynamic task: A system dynamics cognitive model of the slope effect. In *Paper presented at the 8th International Conference on Cognitive Modeling*, Ann Arbor, MI, 26th July 2007, 61-66.

Dutt, V., Schmerl, B., & Garlan, D. (Unpublished). Discovering Communication Protocols between Software Elements (runtime objects) in Software Architectures. Part of Independent Study taken when pursuing Master's in Software Engineering, Carnegie Mellon University, Pittsburgh, PA.

Dutt, V. & Kumar, S. (2006). Learning Transistor Characteristics using Neural Networks. *Published in ECCS 2006*. Patiala, India.

Dutt, V. & Thiagaraj, V. (2005). The Concept of Classification in Data Mining using Neural Networks. *Published in NCBC 2005*. Patiala, India.

EDITORSHIPS

- Associate Editor, *Frontiers in Cognitive Science* journal, <http://loop.frontiersin.org/people/48650/overview>
- Review Editor, *Frontiers in Neuroscience* journal, <http://loop.frontiersin.org/people/48650/overview>
- Editor, Special Issue on "Human decision-making in combat situations involving traditional and immersive visual technologies" in *Frontiers in Psychology (Cognitive Science)*
- Editor, Special Issue on "Adversarial Cybersecurity" in *Cybersecurity (Springer)*
- Editor, Special Issue on "Applications of Cognitive Approaches to Cyber Security" in *Frontiers in Cognitive Science* journal.
- Lead Author for Chapter 2 on "Integrated Risk and Uncertainty Assessment of Climate Change Response Policies" in Intergovernmental Panel on Climate Change (IPCC)'s 5th Assessment Report (AR5): <http://mitigation2014.org/contributor/chapter-2>
- Knowledge Editor, English Financial Daily, *Financial Chronicle*: <http://www.mydigitalfc.com/>

GRADUATE COMMITTEES

| STUDENT NAME | POSITION | DATES |
|---------------------|---|--------------------|
| Neha Sharma | Advisor, Ph.D. Doctoral Committee | Graduated |
| Palvi Aggarwal | Advisor, Ph.D. Doctoral Committee | Graduated |
| Abhijeet Seth | Advisor, M. Tech. Thesis Committee | Graduated |
| Shivendra Sangar | Co-Advisor, Ph.D. Doctoral Committee | Graduated |
| Medha Kumar | Advisor, Ph.D. Doctoral Committee | Graduated |
| Pratik Chaturvedi | Advisor, Ph.D. Doctoral Committee | Thesis submitted |
| Akash K Rao | Advisor, M.S. Academic Progress Committee | Graduated |
| Zahid Maqbool | Advisor, Ph.D. Doctoral Committee | Graduated |
| Abhinav Choudhury | Advisor, Ph.D. Doctoral Committee | Thesis submitted |
| Shruti Kaushik | Advisor, Ph.D. Doctoral Committee | Graduated |
| Praveen Kumar | Advisor, M.S. Academic Progress Committee | Graduated |
| Ankush Pathania | Advisor, M.S. Academic Progress Committee | Thesis submitted |
| Tushar Saini | Advisor, M.S. Academic Progress Committee | Aug 2019 - Present |
| Gitanshu Choudhary | Advisor, Ph.D. Doctoral Committee | Jan 2020 – Present |
| Shashank Uttrani | Advisor, M.S. Academic Progress Committee | Jan 2020 – Present |
| Harsh Katakwar | Advisor, M.S. Academic Progress Committee | Jan 2020 – Present |

SELECTED UNDERGRADUATE THESIS PROJECTS

Project: Development of machine-learning models for glucose predictions from differential equation models.
Student: Aashima

Project: Development of machine-learning models for accelerometer vibration analyses.
Student: Sanchit Yadav

Project: Development of machine-learning models on soil movement predictions.
Student: Pavan and Raj Kumar

Project: Development of machine-learning models on air-pollution predictions.
Student: Suraj

Project: AI models of exploration in VR-based built environments.
Student: Aditya Arora and Aman Saxena

Project: Development of time-series models for glucose predictions from differential equation models.
Student: Mukul and Karan (graduated)

Project: Development of machine-learning models for air-quality predictions.
Student: Gagandeep (graduated)

Project: Development of machine-learning models for soil movement predictions.
Student: Bharat Lodhi (graduated)

Project: Decision-making in cybersecurity games.
Student: Suryavanshi (graduated)

Project: Decision-making in climate change games.
Student: Sylvia Mittal (graduated)

Project: Investigating deep-learning models to forecast healthcare-related expenditures
Student: Pankaj Sheoran (graduated)

Project: Applying deep-learning to predict debris-flow at Tangni landslide on NH-58
Student: Abhijeet Sharma (graduated)

Project: Tool health monitoring using IoT and machine-learning
Student: Rushil Singhal and Amit (graduated)

Project: Developing a real-time cyber-security environment for studying deception in the laboratory
Student: Aksh and Vaibhav (graduated)

Project: Development of signalling system for narrow roads.
Student: Maeghel Puri, Partik Rajput, and Anindya
(graduated)

Project: Patient Finder Application.
Student: Amod Kumar Choudhary and Vinay Goel (graduated)

Project: Patient Journey Application.
Student: Saksham Bathla and Kapardi Trivedi
(graduated)

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Project: Developing IVD, VR and AR defense applications in Unity.
Student: Priyanka (graduated)

Project: Evaluating different road traffic scenarios in a Computer-Based game.
Student: Sandesh Kumar Singh and Kumar Mehta (graduated)

Project: Visualization of Big Data in Pharma.
Student: Anzer Moid and Kaustubh Mallik (graduated)

Project: Development of a realistic battle scenarios.
Student: Jibraan Singh (graduated)

Project: Emotion-based Social Networking App for Android.
Student: Chinmay Krishna (graduated)

Project: Investigating human understanding of Climate Change via Dynamic Climate Change Simulator.
Student: Afser Reza and Rishab Sahu (graduated)

Project: When Cyber Attacker Plays Nash equilibrium in Dynamic Security Game.
Student: Nidhi Manoj Makhijani (graduated)

Project: Effect of environmental and human conditions and human driving behavior.
Student: Vinod Kumar (graduated)

Project: Cognition in an IVD environment.
Student: Chandan Satyarthi (graduated)

Project: Affective, Expressive, and Cognitive Decision Making through Emotiv Epoc
Student: Mahesh Yadav, Khushali Modi, Divya Goyal (graduated)

Project: ACT-R Models of Driving Behavior
Student: Ajay Kumar, Jai Prakash

Project: Cyber Situation Awareness: Game Theoretic Analysis of Cyber Attacks
Student: Saumya Singh, Antra Grover

Project: Cyber Situation Awareness: Testing the Effects of Similarity and Attack Strategy on Cyber Attack Detection
Student: Amanjot Kaur (graduated)

Project: Cyber Situation Awareness: Testing the Effects of Tolerance and Attack Strategy on Cyber Attack Detection
Student: Aman Arora (graduated)

Project: Cyber Situation Awareness: Testing the Effects of Recency and Inertia on Cyber
Attack Detection
Student: Ramakrishna Reddy and Basava Kanaparthi (graduated)

Project: Effects of feedback, social norms, and competition on energy conservation behavior
Student: Ishansh Singh, Shammash Mohyaddin, Sunanda Yadav, Devang Moyal (graduated)

Project: Decisions from experience in sampling: Sampling strategies, sample size, and final choice
Student: Pankaj Sharma, Nikhil Kumar Gupta, Ashish Gupta (graduated)

Project: Charting Indigenous Populations in the World (co-advising with Prof. Rajeshwari Dutt)
Student: Devinder Yadav, Shekhar Solanki (graduated)

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Project: Archiving the history of IIT, Mandi (co-advising with Prof. Rajeshwari Dutt)

Student: Nishant Goyal, Divya Gandhi (graduated)

AD-HOC REVIEWER OF JOURNALS

Journal of Behavioral Decision Making, Journal of Environmental Psychology, Global Environment Change, System Dynamics Review, Organizational Behavior and Human Decision Processes, Journal of Cognitive Engineering and Decision Making, Cognitive Systems Research, Environmental Science & Policy, Information Fusion, Frontiers in Decision Neuroscience, Frontiers in Cognitive Science.

AWARDS, HONORS AND INVITED TALKS

| HONOR | YEAR |
|--|----------------|
| SKOCH Award (Gold), Safety & Security for Landslide Monitoring and Warning System | 2020 |
| Organizer, UKIERI – DST international workshop on adversarial cybersecurity | 2020 |
| ACT-R tutorial as part of the One Week Short Course/FDP on Cognition and Computation, IIT Roorkee | 2020 |
| Member of Editorial Board of <i>Management and Business Review (MBR)</i> journal | 2019 |
| Founder of first faculty-led start-up at IIT Mandi, iloTs | 2019 |
| Organizer, Winter School on Cognitive Modeling, IIT Mandi | 2019, 2020 |
| Senior Member, IEEE | 2018 |
| 3rd Prize, Development of Innovative prototypes for disaster risk reduction, HP Government | 2018 |
| Special Topics Editor, <i>Frontiers in Cognitive Science</i> | 2017 |
| Member of Program Committee of IEEE 2017 International Symposium on Computational and Business Intelligence (ISCB1 2017) | 2017 |
| Member of Program Committee of IEEE Cyber Incident 2017: International Conference On Cyber Incident Response, Coordination, Containment & Control | 2017 |
| Member of Program Committee of IEEE Social Media 2017: International Conference On Social Media, Wearable And Web Analytics | 2017 |
| Best student paper award at AHFE 2016 | 2016 |
| Review Editor, <i>Frontiers in Decision Neuroscience</i> | 2016 |
| Member of Program Committee of IEEE Cyber SA 2016, London, UK | 2016 |
| Best paper award in IEEE International Conference on Cyber Situational Awareness, Data Analytics and Assessment (CyberSA 2015) | 2015 |
| Review Editor, <i>Frontiers in Cognitive Science</i> | 2015 |
| Member of Program Committee for ACM IUI 2015 | 2015 |
| Member of Technical Committee of the Confluence: The Next Generation Information Technology Summit 2014 | 2014 |
| Invited speaker at the Energy and Sustainability Conference ISB Mohali | 2014 |
| Invited for the IEEE/PES Talk on "Decisions from Experience reduce Misconceptions on Climate Change" at Pittsburgh, USA | 2014 |
| Member of Technical Program Committee/Advisory Committee for the 2013 IEEE International Conference on MOOC, Innovation and Technology in Education (MITE) | 2013 |
| Technical Theme Chair for Theme V: Economics of Knowledge Management at the 2013 IEEE Conference on Information Management in the Knowledge Economy (IMKE) | 2013 |
| Invited for the United Nation's Fourth Lead Author Meeting (LAM4) on IPCC (WG III) 5th Assessment Report (AR5) in Addis Ababa, Ethiopia | 2013 |
| Invited talk at a 2-day workshop on "Decision Making and the Environment" at University of Heidelberg, Germany | 2013 |
| Lead Author for Chapter 2 on "Integrated Risk and Uncertainty Assessment of Climate Change Response Policies" in IPCC (WG III) 5th Assessment Report (AR5) | 2012-2015 |
| Reached the final round of MIT Technology Review Young Innovators Under 35 Awards, 2013 | 2013 |
| Keynote talk in the plenary session (titled "Promising Young Indian Contributors") at NAOP | 2012 |
| Two Papers accepted in the journal <i>Psychological Review</i> | 2011, 2012 |
| Marquis Who's Who of the World | 2006 – Present |

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|---|---------------------------|
| 1000 Greatest Minds of 21st Century | 2008 |
| Runner-up prize in the Market Entry Prediction Competition, | 2008 |
| Tutorial presenter at BRIMS 2011 Conference, Sundance Resort, UT | 2011 |
| Panel discussion at BRIMS 2010 Conference, Charleston, SC | 2010 |
| Talk on VB-ACT-R Tutorial, RMPA Conference, Denver, CO | 2010 |
| Talk in EESM Seminar Steinbrenner Institute, Carnegie Mellon | 2009 |
| Talk at Dynamic Decision Making Lab, Carnegie Mellon | 2007, 2009, 2010, 2011 |
| Talk at Carnegie Mellon's Graduate Student Appreciation Week 2011 | 2011 |
| Tutorial Presenter and Talk at HFES 2011 | 2011 |
| http://sites.google.com/site/gpredcomp/8-competition-results-and-winners | |

ACTIVITIES AND AFFILIATIONS

Senior member of Institute of Electrical and Electronics Engineers (IEEE), Inc, USA (www.ieee.org)
Member of System Dynamics Society (SDS), USA (<http://www.systemdynamics.org>)
Member of Society of Risk Analysis (SRA), USA (<http://www.sra.org/>)
Member of Division 34 [Population and Environmental Psychology], American Psychological Association, USA (<http://www.apa.org/divisions/div34/>)
Member of Society of Judgment and Decision Making, USA (www.sjdm.org)

SELECTED MEDIA COVERAGE

Please see: <https://rb.gy/nhd2lr>

REFERENCES

| | | |
|---|---|--|
| Dr. Cleotilde Gonzalez Professor Dept. Social & Decision Sciences Carnegie Mellon University Porter Hall, Pittsburgh, PA 15213 Email: coty@cmu.edu | Dr. Deepak Garg Professor and Head of Department Department of Computer Engineering Bennett University Greater Noida, India-201310 Email: deepak.garg@bennett.edu.in | Dr. Rajesh Kumar Bhatia Professor Computer Science and Engineering PEC University of Technology Sector 12, Chandigarh 160012 Email: rbhatia@pec.ac.in |
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