

Dr. Nitin Yadav

M.B.B.S, M.CS, M.Fin, PhD

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Over 5 years of research experience in areas of Artificial Intelligence, application of computational complexity to decision making, and problems at the intersection of finance and computer science. Proven ability to think creatively as well as innovatively, while having a systematic and analytical approach to problem solving. Over 10 years of experience in application development and software engineering applied across multiple disciplines.

Research

Interests.....

- Multidisciplinary research involving Computer Science/Artificial Intelligence, in particular, experimental finance, algorithmic trading, risk and uncertainty.
- Artificial Intelligence areas such as intelligent agent systems, agent programming languages, behaviour composition problem, and formal verification of agent designs.

Publications.....

1. P. Bossaerts, N. Yadav, and C. Murawski. "Uncertainty and computational complexity". In: *Philosophical Transactions of the Royal Society B* 374.1766 (2018)
2. N. Yadav, C. Murawski, S. Sardina, and P. Bossaerts. "Phase transition in the knapsack problem". In: *arXiv preprint arXiv:1806.10244* (2018)
3. M. Winikoff, N. Yadav, and L. Padgham. "A new Hierarchical Agent Protocol Notation". In: *Autonomous Agents and Multi-Agent Systems* 32.1 (2018), pp. 59–133
4. N. Yadav, J. Thangarajah, and S. Sardina. "Agent design consistency checking via planning". In: *International Joint Conference on Artificial Intelligence(IJCAI)* (2017), pp. 458–464
5. P. Felli, N. Yadav, and S. Sardina. "Supervisory Control for Behavior Composition". In: *IEEE Transactions on Automatic Control* 62.2 (2017), pp. 986–991
6. N. Yadav and J. Thangarajah. "Checking the Conformance of Requirements in Agent Designs Using ATL.". In: *Proceedings of the 22nd European Conference on Artificial Intelligence (ECAI-2016)*. European Conference on Artificial Intelligence (ECAI). IOS Press, Aug. 2016, pp. 243–251
7. R. Evertsz, J. Thangarajah, N. Yadav, and T. Ly. "A framework for modelling tactical decision-making in autonomous systems". In: *Journal of Systems and Software* 110 (2015), pp. 222–238
8. R. Evertsz, J. Thangarajah, N. Yadav, and T.C. Ly. "Agent oriented modelling of tactical decision making". In: *Proceedings of the International Joint Conference on Autonomous Agents and Multiagent Systems, AAMAS 2* (2015), pp. 1051–1060
9. R. Evertsz, J. Thangarajah, N. Yadav, and T. Ly. "Tactics development framework". In: *13th International Conference on Autonomous Agents and Multiagent Systems, AAMAS 2014 2* (2014), pp. 1639–1640
10. M. Ramirez, N. Yadav, and S. Sardina. "Behavior composition as fully observable non-deterministic planning". In: *ICAPS 2013 - Proceedings of the 23rd International Conference on Automated Planning and Scheduling* (2013), pp. 180–188

11. N. Yadav, P. Felli, G. De Giacomo, and S. Sardina. "Supremal realizability of behaviors with uncontrollable exogenous events". In: *IJCAI International Joint Conference on Artificial Intelligence* (2013), pp. 1176–1182
12. N. Yadav and S. Sardina. "Using strategic logics to reason about agent programs". In: *IJCAI International Joint Conference on Artificial Intelligence* (2013), pp. 3101–3105
13. N. Yadav and S. Sardina. "Qualitative approximate behavior composition". In: *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* 7519 LNAI (2012), pp. 450–462
14. N. Yadav and S. Sardina. "Reasoning about agent programs using ATL-like logics". In: *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)* 7519 LNAI (2012), pp. 437–449
15. N. Yadav and S. Sardina. "Decision theoretic behavior composition". In: *10th International Conference on Autonomous Agents and Multiagent Systems 2011, AAMAS 2011 1* (2011), pp. 537–544
16. N. Yadav, C. Zhou, S. Sardina, and R. Rönquist. "A BDI agent system for the cow herding domain". In: *Annals of Mathematics and Artificial Intelligence* 59.3-4 (2010), pp. 313–333

Grants

1. ARC Linkage Grant (2019–2022) with Prof. Peter Bossaerts, Prof. John Ledyard, Prof. Malick Sy, Wellton-Trent Singapore for research and development of a combinatorial order processing facility.
2. Teaching Innovation Grant (2019) with Dr. Felix Fattinger, Prof. Carsten Murawski and Prof. Peter Bossaerts for the Foundations of Fintech subject.
3. Faculty Research Grant (2017) with Prof. Tom Wilkening for developing infrastructure for combinatorial order processing for land trade and development.
4. Teaching Innovation Grant (2016) with Prof. Peter Bossaerts for the Algorithmic Trading subject.

Development of Research & Teaching Tools

1. *FMClient*: A python based library to interact with Flexmarkets. This library is used in teaching Algorithmic Trading subject and research involving algorithmic trading.
2. *AlgoHost*: A web based system to host trading robots. This system is used in algorithmic trading research and to study human-robot interactions.
3. *BMM Coin system*: An Ethereum based blockchain and smart contract system used for the Foundations of Fintech subject.
4. *COEx*: An combinatorial exchange system to match combined value orders. This is a prototype system for an ARC Linkage grant.
5. A collection of Jupyter hub systems for interactive tutorials and custom machine learning packages hosted for the Foundations of Fintech subject.
6. *SimEx*: A financial market simulator that was used across multiple subjects, and for research, at RMIT.

Awards and Educational Achievements

- **Best paper** in JELIA 2012 for paper titled "Reasoning about agent programs using ATL-like logics".
- Best student award in Masters in Computer Science in 2010, RMIT University.
- High achievement award in Masters in Computer Science in 2010, RMIT University.
- High achievement scholarship from school of Computer Science and I.T., 2009.
- School Topper in Science Stream (in the equivalent of 'O' and 'A' levels), 1995-1997.
- Gold Medal at the National Physics Olympiad, 1997.

Education

- **Masters in Finance (Part Time)** **Australia**
RMIT University 2014-2017
- **PhD in Computer Science** **Australia**
Behaviour composition optimisation, RMIT University. 2010-2014
- **Masters in Computer Science** **Australia**
Majoring in Artificial Intelligence, RMIT University. 2008-2009
- **Bachelors in Medicine and Surgery** **India**
Delhi University 1997-2002

Work Experience

Skills: Python, Java, MySQL, R, PHP, HTML/CSS, Javascript, JACK.

- **Senior Lecturer** 2019-To Date
Department of Finance. The University of Melbourne
- **Research Fellow** 2016-2019
Brain, Mind, and Markets Lab. The University of Melbourne
- **Research Fellow** 2014-2016
Intelligent Agents Group. RMIT University
- **Software Engineer** 2015-2016
School of Economics, Finance, and Marketing. RMIT University
- **Research Programmer** 2009-2012
Thinking Head Project. Univeristy of Western Sydney
- **Analyst Programmer** 2008-2010
Attcomm Enterprises Pty. Ltd.
- **Technical Lead** 2004-2008
Digidocs India
- **Software Developer** 2002-2004
Antaeus Information Pty. Ltd., India

Teaching Experience

- **Lecturer & Coordinator: Algorithmic Trading (FNCE30010)**
Department of Finance, The University of Melbourne 2017-2019
- **Lecturer: Foundations of FinTech (FNCE30012)**
Department of Finance, The University of Melbourne 2019
- **Guest Lecturer: Computing Theory (COSC1105/1107)**
School of Computer Science and I.T., RMIT University 2016
- **Guest Lecturer: Games and Artificial Intelligence Techniques (COSC2528)**
School of Computer Science and I.T., RMIT University 2014
- **Guest Lecturer: Java for Programmers (COSC1295)**
School of Computer Science and I.T., RMIT University 2014
- **Guest Lecturer: Computing Theory (COSC1105/1107)**
School of Computer Science and I.T., RMIT University 2012-2013
- **Guest Lecturer: Research Methods (COSC 2148/2149)**
School of Computer Science and I.T., RMIT University 2012
- **Tutor/Head Tutor: Computing Theory (COSC1105/1107)**
School of Computer Science and I.T., RMIT University 2011-2014, 2016
- **Tutor: Artificial Intelligence (COSC1125/1127)**
School of Computer Science and I.T., RMIT University 2010, 2013
- **Tutor: Java for Programmers (COSC1295)**
School of Computer Science and I.T., RMIT University 2009–2011

Supervision

- **Anthony Hsu**
Research honors thesis. Approximation complexity and human decision making. 2018
Co-supervised with Prof. Carsten Murawski
- **Lorenzo Dibenedetto**
Research masters thesis. Integrating ATL coalitions in NuGAT. 2015-2016
Co-supervised with A/Prof. Sebastian Sardina.
- **Minh Tran**
Application development project for TDF methodology. 2016
Co-supervised with Dr. Rick Evertsz.