KISHOR PATIL

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RESEARCH INTERESTS

Stochastic Modelling, Queueing theory, Wireless Sensor Networks, Markov Decision Process, Mean Field Limits

EDUCATION

Ph.D., Telecommunications and Information Processing, Ghent University — Dec. 2015 - Present
M.Tech., Industrial Engineering and Operations Research, IIT Bombay (GPA: 9.16/10) — Jul. 2012 - Jun. 2014
B.Tech., Electronics and Telecommunication, SGGSIET Nanded (GPA: 8.43/10) — Jul. 2008 - Jun. 2012

RESEARCH EXPERIENCE

Ph.D. Research
Ghent University, Advisor: Prof. D. Fiems — Dec. 2015 - Present

- Studied optimal control of a two queue stochastic model for an energy harvesting wireless sensor node in a Markov decision processes framework, and analysed the impact of the value of information on the transmission policy of the node.
- Proposed and solved a stochastic model for an energy harvesting wireless sensor node where the energy harvesting process is Markov-modulated and the data sensing process is ergodic. The performance analysis of the model can be used for optimising the design of wireless sensor networks (WSNs).
- Proposed a numerically tractable stochastic model for the performance evaluation of depth-based routing in underwater wireless sensor networks which can be used for optimisation purposes as it requires limited computational efforts.
- Working on large-scale energy harvesting WSNs where the number of sensor nodes interact with each other using scaling techniques like heavy-traffic limits, fluid and diffusion limits, and mean field approximations.

Visiting Research Fellow — Sep. 2018 - Nov. 2018
Laboratoire des Signaux et Systèmes, CentraleSupélec, Supervisor: Dr. K. De Turck

- Developed a stochastic model for large sensor networks without energy harvesting dynamics, relying on large-scale techniques including a mean field approach, fluid and diffusion limits.
- Investigated how well these models could capture the performance of the sensor networks by comparing numerical experiments with the model with the outcome of simulation experiments.
- Obtained some interesting theoretical proprieties of the optimal transmission policies which are easy to implement in practice, such as a bang-bang nature and a threshold structure.

Firm User-set Interactions in the Context of Admission Control Queues
Master Thesis, IIT Bombay Advisor: Prof. N. Hemachandra — May. 2013 - Jun. 2014

- Developed a model for an admission control system as a firm-market interaction, and analysed its equilibrium point for both average and discounted reward using parameterised Markov Decision Process (MDP).
- Explored the model for different non-exponential arrival distributions and obtained interesting theoretical properties on the monotonicity of the QoS and the existence of a finite control limit.

PROFESSIONAL EXPERIENCE

HSBC Data Processing Centre Bangalore Analyst - Business Consulting — Jul. 2014 - Oct. 2015

Correspondent Banking - Financual Crime Compliance/ Risk Compliance

- Worked as an individual contributor during the entire project for model development, deployment, validation and tuning with multiple regions such as UK and HK.
- Developed a model for correspondent banking to detect suspicious activities resulting in money laundering using techniques like linear regression, forecasting, Above the Line (ATL) and Below the Line (BTL) testing.
- Implemented complete model in SQL/SAS and automated the whole model to speed up the process.

Global Investigation Analytics

- Built a Global Investigation Analytic function to support ATL testing and BTL validation for existing transaction monitoring scenarios (TMS).

· Introduced standardised, efficient and scalable event triage system which scores all events generated by any TMS based on a balanced risk tiered model.

TEACHING EXPERIENCE

Ghent University
Teaching Assistant, Department of TELIN, Ghent University

· **C003399** Computer Intensive Statistical Methods — Spring 2018

IIT Bombay
Teaching Assistant, Department of IEOR, IIT Bombay

· **IE 616** Decision Analysis and Game Theory — Spring 2014
· **IE 605** Engineering Statistics — Autumn 2013

JOURNAL PUBLICATIONS

· **K. Patil** , M. Jafri, D. Fiems and A. Marin. Stochastic Modeling of Depth Based Routing in Underwater Sensor Networks. *Ad Hoc Networks* 1570-8705 (19) : 132-141, 2019
· **K. Patil**, K. De Turck, and D. Fiems. Optimal data collection in wireless sensor networks with correlated energy harvesting. *Annals of Telecommunication* 1958-9395 : 1-12, 2018.
· **K. Patil**, and D. Fiems. The value of information in energy harvesting sensor networks. *Operations Research Letters* 46 (3) : 362-366, 2018.
· **K. Patil**, K. De Turck, Koen and D. Fiems. A two-queue model for optimising the value of information in energy-harvesting sensor networks. *Performance Evaluation* 0166-5316 (119) : 27-42, 2017.

SELECTED CONFERENCE TALKS

· **K. Patil**, M. Jafri, D. Fiems and A. Marin — StochMod 2018
Performance Evaluation of Depth Based Routing in Underwater Sensor Networks
· **K. Patil**, and K. De Turck, Koen and D. Fiems — ECQT 2018
Optimal control in wireless sensor networks: a mean-field approach
· **K. Patil**, and K. De Turck, Koen and D. Fiems — ASMTA 2016
Optimal data collection in hybrid energy-harvesting sensor networks

SKILL SET

Programming Languages	Python, C, SQL, AMPL, R
Computational/ Utility tools Tools	MATLAB, Mathematica, LaTeX
Statistical Tools	R, SAS
Platforms	Mac OS (X), Linux (Ubuntu)

RELEVANT WORKSHOP AND COURSEWORK

Workshops

· Summer school on Numerical methods for stochastic models: mean-field, CIRM, Marseille — summer 2017
· Introduction to High performance Computing, Ghent University — Spring 2017
· Workshop on Mathematica, Ghent university — Autumn 2016

Selected Coursework

· E014230 - Stochastic Processes — Autumn 2017
· E012320 - Mobile and Broadband Access Networks — Autumn 2017
· IE 708 - Markov Decision Processes — Spring 2013
· IE 611 - Introduction to Stochastic Models — Autumn 2012

EXTRACURRICULAR ACTIVITIES

· Jury member of master thesis committee; Thesis entitled "The P2Pool mining pool - An analysis of a distributed cryptographically secured database". — Oct. 2017
· Volunteering at master thesis fair at Ghent university to give the information on department's research domains so that students can choose their thesis topic. — Feb. 2017
· Student Companion for the IEOR department, helping new entrants in various academic and non- academic issues. — Jul. 2013 - Jun. 2014