Kishor Patil (Ph.D.)

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Research Experience

Oct. 2019 – Present

INRIA, Sophia Antipolis, France

Postdoctoral Research Scientist

- *Working on dynamic scheduling for adaptive web page crawling with reinforcement learning (RL) using Multi-arm restless bandits.*
- *Obtained Whittle indices of restless bandits online through Q-learning (each bandit represents single web page that needs to be refreshed). Especially for large state space, these indices are learned through deep RL.*
- *Developed three novel online algorithms which can learn the actual dynamics of web page change process almost surely.*
- *Working on deep RL models for influence maximisation in dynamic complex networks.*

Dec. 2015 – Sept. 2019

Ghent University

Ph.D. student

- *Obtained optimal control policies for an energy harvesting wireless sensor node in a Markov decision processes (basis of RL) framework.*
- *Proposed a stochastic model for a wireless sensor node with correlated energy harvesting. The performance analysis of the model can help to optimise the design of networks.*
- *Proposed tractable model for age of information in energy harvesting sensor node.*

Sept. 2018 – Dec. 2018

L2S, CentraleSupélec, Paris, France

Visiting Research Fellow

- *Developed a stochastic model for large sensor networks, relying on mean field approximations for Markov decision processes.*
- *Investigated the performance of the sensor networks by comparing numerical experiments with the outcome of simulations.*
- *Obtained some interesting theoretical proprieties such as a bang-bang nature and a threshold structure.*

Professional Experience

Jul. 2014 – Oct. 2015

HSBC Data Processing Centre, Bangalore, India

Analyst - Business Consulting

- *Model development, deployment, validation and tuning with multiple regions (UK, 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.*

Key Interests

Markov Decision Processes, Reinforcement Learning, Multi-Arm Restless Bandits, Mean-field Approximation, Stochastic Modelling, Game theory.

Education

2015 – 2019	*Engineering Sciences (Computer)* Ph.D. *Ghent University, Belgium*
2012 – 2014	*Operations Research* M.Tech (GPA 9.16/10) *IIT Bombay, India*
2008 – 2012	*Electronics & Telecom.* B.Tech (GPA 8.43/10) *SGGSIET Nanded, India*

Additional Training

Workshops

2017	*Numerical methods for stochastic models: mean-field limits*
2016	*Parallel processing Mathematica*

Courseworks

2018	*Game Theory: Engineering Applications*
2017	*Stochastic Processes*
2013	*Convex Optimisation*
2012	*Integer Programming*

Skill sets

Programming	Python (numpy, pytorch), C, SQL, AMPL, R
Utility Tools	MATLAB, Mathematica, LaTeX, Pycharm, BOCOP
Platforms	Mac OS (X), Linux (Ubuntu, Fedora), Windows

Selected Talks

2020	*Online algorithms for estimating page change rates in adaptive web crawling* *INRIA, France*
2019	*Value of information in energy harvesting sensor networks* *IIT, Bombay*
2018	*Optimal control in wireless sensor networks: a mean-field approach* *ECQT, 2018, Israel*

Publications

*Alphabetical Order

Under Review Articles

1. K. Avrachenkov,**K. Patil***, and G. Thoppe. Online Algorithms for page change rate estimation. 2020, Performance Evaluation *Sumbmitted*.
2. N. Hameachandra, **K. Patil**, and S. Tripathi. Equilibrium points and equilibrium sets of some GI/M/1queues. 2020, Queueing systems, *First revision completed.*

Published Articles

3. **K. Patil** , M. Jafri, D. Fiems and A. Marin. Stochastic Modelling of Depth Based Routing in Underwater Sensor Networks. *Ad Hoc Networks* 1570-8705 (19) : 132-141, 2019
4. **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.
5. **K. Patil**, and D. Fiems. The value of information in energy harvesting sensor networks. *Operations Research Letters* 46 (3) : 362-366, 2018.
6. **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* (119): 27-42, 2017.

Conference Proceedings

7. K. Avrachenkov, **K.Patil*** and G. Thoppe. Change Rate Estimation and Optimal Freshness in Web Page Crawling, *13th EAI International Conference on Performance Evaluation Methodologies and Tools*. ACM, New York, NY, USA, 3–10. 2020
8. **K. Patil**, K. De Turck, and D. Fiems. Optimal Data Collection in Hybrid Energy-harvesting Sensor Networks. *Analytical and Stochastic Modelling Techniques and Applications* 9845:239–252, 2016.
9. N. Hemachandra, S. Tripathi, and **K. Patil**. Equilibrium sets of some $GI/M/1$ queues (with more examples). *IIT Bombay* 2016.

Under Preparation

10. K. Avrachenkov, **K.Patil***. Deep reinforcement learning for web page crawling:restless bandit approach. 2020, under preparation.
11. K. Avrachenkov, Haleh Dijazi, **K.Patil***. Deep reinforcement learning for influence maximisation in dynamic complex networks, under preparation.
12. **K. Patil**, K. De Turck, and D. Fiems. Optimal Control in Wireless sensor networks - A mean field approach. 2020, under preparation.

Teaching Experience

Spring 2018	*Teaching Assistant: C003399 - Computer Intensive Statistical Methods* *Ghent University, Belgium*
Spring 2014	*Teaching Assistant: IE 616 - Decision Analysis and Game Theory* *IIT Bombay, India*
Autumn 2013	*Teaching Assistant: IE 605 - Engineering Statistics* *IIT Bombay, India*

Extra-Academic Activities

2020	Guided Ph.D. student (Heleh Dijazi) on Reinforcement learning for influence maximisation in dynamic social networks.
2018	Jury member of master thesis committee; Thesis entitled “The P2Pool mining pool - An analysis of a distributed cryptographically secured database”.
2017	Volunteered at master thesis fair at Ghent university to give the information on department’s research domains so that students can choose their thesis topic.
20XX	Reviewer for Performance Evaluation, Annals of operations Research, MDPI - Mathematics