

Curriculum Vitae

Vartika Singh
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🔗 webpage link

Academics

Mtech+PhD dual degree Student
Indian Institute of Technology Bombay

Aug. 2018 – Present
Industrial Engineering and Operations Research (IEOR)

Bachelor of technology
Uttar Pradesh Textile Technology Institute

2014 – 2018
Textile Chemistry

Scholastic achievements

- Received Prime Minister Research Fellowship (PMRF), India
- Secured All INDIA RANK 3 in GATE 2018 Textile Engg and Fibre Science

Publications

Vartika Singh and Veeraruna Kavitha. "Asymmetric Information Acquisition Games." 2020 59th IEEE Conference on Decision and Control (CDC). IEEE, 2020.

- Analysed the stochastic game resulting from agents competing to acquire finite locks sequentially
- Proved that simplified threshold policies form the equilibrium using Markov Decision Process and optimal control theory

Vartika Singh, Khushboo Agarwal, Shubham and Veeraruna Kavitha, "Evolutionary Vaccination Games with premature vaccines to combat ongoing deadly pandemic." Valuetools 2021.

- Analysed asymptotic infected and vaccinated fractions of population under various population behaviours
- Derived evolutionary stable population behaviours and evolutionary stable infected and vaccinated proportions

Vartika Singh and Veeraruna Kavitha. "Partial information games and competitive advertising." *Manuscript submitted to Mathematics of Operations Research 2022.*

- Analysed the competitive advertising among content providers to acquire hidden customers over a social network
- Proved that threshold policies form the equilibrium and provided an algorithm to derive the same numerically
- Provided a general framework applicable to variety of asynchronous stochastic games with partial information

Research interests

- Partial information games, Dynamic games, Stochastic games, Markov decision process, Q -learning

Ongoing Research

PhD Supervisor: Professor Veeraruna Kavitha

Jul. 2019-Present

Stochastic game among Leader, population and public

- Population in the midst of a pandemic with influencers influencing population response towards vaccine
- The leader aims to make eradication of disease evolutionary stable via vaccination, by providing incentives to influencers
- System results in a layered stochastic game, with population dynamics captured via Evolutionary game theory
- Leader and influencers have Stackelberg game, and influencers have dynamic game among themselves

New outlook at Constrained Markov Decision Process

- Deriving an alternate algorithm to solve constrained Markov Decision Process

Conference presentation

EAI VALUETOOLS 2021 - 14th EAI International Conference on Performance Evaluation Methodologies and Tools. Presented *Evolutionary Vaccination Games with premature vaccines to combat ongoing deadly pandemic*