Deyi Wang

Email: deyiwang1999@g.ucla.edu

Education Background

University of California, Los Angeles **GPA** 4.0/4.0

Department of Electrical and Computer Engineering, ***Master of Science program*** **Sep. 2022 - Present**

Courses: Matrix Analysis (A+), Linear Programming (A), Convex Optimization (A+), Linear Dynamic Systems (A+), Nonlinear Dynamic Systems (A+), Stochastic Processes (A), Theoretical Foundation of Reinforcement Learning (A+), Large Scale Social and Complex Networks: Design and Algorithms (A)

Tongji University **Grade** 87.94/100

College of Electronics and Information Engineering, ***Bachelor of Engineering in Automation*** **Sep. 2017 - Jun.2021**

School of Mathematical Sciences, ***Mathematics and Applied Mathematics (Minor)*** **Sep. 2017 - Jan.2019**

Work Experience

Shanghai Research Institute for Intelligent Autonomous Systems, Tongji University **Jul.2021 - Jul.2022**

Research Assistant supervised by Prof. Xiang Li

Research Experience

The in-host model for viral infection and its application (*In progress*) **Feb.2023 - Present**

Supervisor: Prof. Christina Fragouli

- Participated in building the nUIV viral spread model based on the UIV in-host viral infection model proposed by Esteban A. *et al.* (2022).
- Participated in verifying the nUIV model by fitting it with the classical SIR model.
- Improved the nUIV model by adding the immunity state to avoid repeated infections.
- Participated in building the averaged system to predict the viral spread among people and viral in-host proliferation.
- Formulated the group testing strategy design problem into a mixed integer programming problem to minimize the uncertainty of people's viral load.

The research on minimum vertex cover problem based on asymmetric game theory **Nov.2021 - Nov.2022**

Supervisor: Prof. Xiang Li

- Mainly focused on the application of the asymmetric snowdrift game to solve the minimum vertex cover problem in vertex-weighted graphs.
- Put forward a theorem interpreting the relationship between the SNE (strict Nash equilibrium) state and the MVC (minimum vertex cover) state in the weighted graph, and restricted the sufficient condition of $\{V_{MWVC}\} \subseteq \{V_{SNE}\} \subseteq \{V_{WVC}\}$ from $\Delta A/\Delta B > 4\lambda_A\lambda_B$ to $\Delta A/\Delta B > 4\lambda_A\lambda_B k_{max}$, where ΔA, ΔB, λ_A, λ_B are attributes of the graphs and the game parameters, and k_{max} is the maximum vertex degree of the graph.
- Improved the proof of theorem which showed the FBR algorithm (feedback & memory based best respond algorithm) could make any arbitrary initial state converge to a SNE state.
- Designed the experiment to verify the new restricted condition, and designed the experiment to show the superiority of FBR algorithm compared to other distributed MWVC algorithms.

- The corresponding paper was accepted by IFAC WC 2023[2].

A social media users classification algorithm based on community detection **May.2019 - May.2020**

Supervisor: Prof. Qi Kang

- Mainly about the local community detection problem in the complex network.
- Put forward n-order degree central nodes conception and improved the seed nodes choosing method.
- The corresponding paper was accepted by a Chinese journal *《微型电脑应用》*(Microcomputer Applications) [1].

In-class Project Experience

Theoretical Foundation of Reinforcement Learning **Spring, 2023**

Instructor: Prof. Lin Yang

- Explored the paper "Model-Based Reinforcement Learning with Value-Targeted Regression" on parameterized MDP online reinforcement learning and explained the proof structure of its main theorem on the regret bound in detail.
- Independently finished a course summary of the course on the basic knowledge, model-based RL, online RL, linearly parameterized RL, and bandit problems with general function approximation.

Nonlinear Dynamic Systems **Winter, 2023**

Instructor: Prof. Bahman Gharesifard

- Conducted a course project focusing on a classic example of nonlinear systems, the unicycle. Explored the regularity, stability, input-to-state stability, and so on of the system based on Lyapunov theory, LaSalle's invariance principle and E. D. Sontag Theorem. Designed control strategies of the system based on feedback linearization and backstepping.
- Explored a specific control topic on structural ensemble controllability. Learned the development of averaged controllability and output controllability. Proposed a potential new sufficient condition of structural average controllability related to paths from the input nodes to all the state nodes.

Publications

[1] **Wang, D.**, Jiao, A., Chen, Y., An, J., Kang, Q., & Wang, L. (2021) Local community detection based on n-order local degree central nodes. Microcomputer Applications, 37(6), 1–4.

[2] **Wang, D.**, Yuan, Q., & Li, X. (2023). A Maximum Degree related Condition to Asymmetric Game in Weighted Vertex Cover Networks. IFAC-PapersOnLine, 56(2), 7394-7401.

Awards

2019 National Physics Contest for non-Physics major undergraduates (Shanghai, China) Second Prize

2020 National Mathematics Contest for non-Math major undergraduates (China) Second Prize

2019 Tongji University Mathematical Contest in Modelling Group Third Prize & Group Leader