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Inpatient Overflow Management with Proximal Policy Optimization

Wednesday, June 19, 2024 11:00 AM (1 hour)

Abstract: Overflow patients to non-primary wards can effectively alleviate congestion in hospitals, while undesired overflow also leads to issues like mismatched service quality. Therefore, we need to trade-off between con- gestion and undesired overflow. This overflow management problem is modeled as a discrete-time Markov Decision Process with large state and action space. To overcome the curse-of-dimensionality, we decompose the action at each time into a sequence of atomic actions and use an actor-critic algorithm, Proximal Policy Optimization (PPO), to update policy. Moreover, we tailor the design of neural network which represents policy to account for the daily periodic pattern of the system flows. Under hospital settings of different scales, the PPO policies consistently outperform some commonly used state-of-art policies significantly.

Session Classification: Keynote: Jim Dai (Cornell University)