

Workforce behaviours in healthcare systems

Michalis Panayides

January 10, 2022

Contents

1	Introduction	2
2	Queueing theoretic model	2
2.1	Markov chain	2
2.1.1	State mapping function	2
2.1.2	Steady state	2
2.1.3	Graph theoretic approach to steady state	2
2.2	Performance measures	2
2.2.1	Waiting time	2
2.2.2	Blocking time	2
2.2.3	Proportion of individuals within target	2
3	Game theoretic model	2
3.1	Formulation	2
4	Methodology	2
4.1	Backwards Induction	2
4.2	Nash equilibrium	2
4.3	Learning algorithms	2
5	EMS-ED application	2
5.1	Formulation	2
5.2	Numerical results	2
6	Agent-based extension	2
6.1	State-dependent model	2
6.2	Server-dependent model	2
6.3	Reinforcement learning	2
7	Results	2
8	Conclusion	2

1	Introduction
2	Queueing theoretic model
2.1	Markov chain
2.1.1	State mapping function
2.1.2	Steady state
2.1.3	Graph theoretic approach to steady state
2.2	Performance measures
2.2.1	Waiting time
2.2.2	Blocking time
2.2.3	Proportion of individuals within target
3	Game theoretic model
3.1	Formulation
4	Methodology
4.1	Backwards Induction
4.2	Nash equilibrium
4.3	Learning algorithms
5	EMS-ED application
5.1	Formulation
5.2	Numerical results
6	Agent-based extension
6.1	State-dependent model
6.2	Server-dependent model
6.3	Reinforcement learning
7	Results
8	Conclusion