Engineering Management, Information, and Systems

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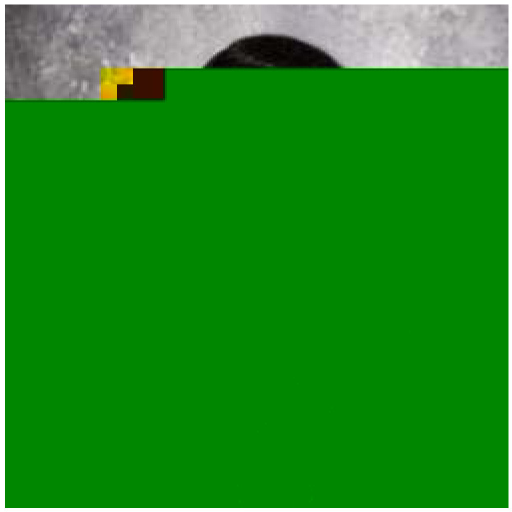
Ph.D. Dissertation Defense



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Secondly, given what we currently know about the world, how should we decide what to do, taking into account uncertainty of future events and observations that may change our conclusions. Many systems evolve over time and often the next state of the system is not known with certainty, often modeled as a probability distribution over system states. Dealing with such systems especially when we can make a decision at different points in time is difficult due to uncertainty. Making optimal decisions requires understanding the system including its characteristics, how it evolves and changes over time, and how taken actions affect the system. There are multiple dimensions to this problem, and each dimension might require its own specific methodt ş oblem n F Ĭ Dž ` ie ehcDž iechod evolution, a predictive model that is used to extract information from the complicated systems and also a prescriptive model that works as the main decision model and incorporates the effects of actions. In this thesis I consider Partially Observable Markov Decision Process lop a framework by

combining these methods and demonstrate its use with two applications. I apply the proposed framework

to the problem of diabetes screening and also resource allocation under uncertainty for emergency management. I demonstrate using simulation that implementing the proposed policy will bring about significant improvements in both systems compared to the existing policies.

] } P Œ Farzad Kamalzadeh is a Ph.D. candidate with a major in Operations Research at Lyle school of engineering. He has been a Research and Teaching Assistant at Southern Methodist University since 2016. He received his B.Sc. in Industrial Engineering from Isfahan Un