جلسه ارائه علمی دانشکده مهندسی صنایع

A Partially Observable Markov Decision Process Approach to Age-dependent Cervical Cancer Screening Policies

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Abstract: Cervical cancer is one of the leading causes of cancer-related deaths in women worldwide, initiated by the human papillomavirus. To detect the presence of precancerous cells or the virus, primary screening guidelines instruct periodic cytology (Pap test) or HPV-DNA tests. We formulate a finite-horizon partially observable Markov decision process (POMDP) model, incorporating the type I and type II errors (the proportion of false positive and false negative diagnoses) of these tests, and age-specific unobservable disease progression and regression. We solve this model to optimality, using Monahan's algorithm with Eagle's reduction. The results show that our proposed screening schedules outperform the existing guidelines with respect to the total expected quality-adjusted life years (QALYs) gained.

Biography: RAHA AKHAVAN-TABATABAEI is an associate professor of Industrial Engineering and the director of Six Sigma Program at Universidad de los Andes. See holds a Ph.D. degree in Industrial and Systems Engineering from North Carolina State University and Six Sigma Master Black Belt from Arizona State University. Her research interests include stochastic modeling and analysis applied to healthcare systems and medical decision making, production and logistics, quality and reliability engineering, and revenue management, among others. http://wwwprof.uniandes.edu.co/~r.akhavan/