Guest Speech

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Title: **Machine Learning in Sleep Medicine: A Focus on Obstructive Sleep Apnea**

Abstract: Obstructive sleep apnea (OSA) is a prevalent sleep disorder characterized by recurrent episodes of partial or complete upper airway obstruction during sleep. OSA can lead to severe health complications, including hypertension, heart disease, and stroke. Traditional OSA diagnosis involves overnight sleep studies, which can be both costly and time-consuming. This presentation examines the potential of machine learning (ML) techniques to improve the accuracy and efficiency of OSA diagnosis and management. We explore the application of ML algorithms in diagnosis OSA patients, as well as the methods for gathering OSA patient data and the challenges associated with it. Additionally, we examine various studies that have utilized ML techniques to analyze data from polysomnography (PSG) and other respiratory signal sources. The presentation provides insights into the advantages and limitations of different ML approaches, including logistic regression, artificial neural networks, and deep learning. In summary, this presentation offers an overview of how ML has the potential to revolutionize the diagnosis of OSA, potentially reducing healthcare costs and improving patient care.

About the speaker: Alaa Sheta is a tenured professor at Southern Connecticut State University, CT, USA. He received his B.E. and M.Sc. degrees in Electronics and Communication Engineering from the Faculty of Engineering, Cairo University, in 1988 and 1994. In 1997, he received his Ph.D. from the Computer Science Department, School of Information Technology and Engineering, George Mason University, Fairfax, VA, USA. Prof. Sheta has held several leadership positions, such as the Associate Dean of Prince Abdullah Bin Ghazi Faculty of Science and Information Technology, Al-Balqa Applied University (BAU), Jordan (2008-2009), and the Assistant Dean for Planning and Development, College of Information Technology, BAU, Jordan (2006-2008). Prof. Sheta supervised more than 35 MS and Ph.D. dissertations. He received the Best Poster Award from the SGAI International Conference on Artificial Intelligence, Cambridge, the UK, in December 2011 for his publication on Quality Management of Manufacturing Processes. With

a research focus on artificial intelligence, machine learning, Swarm Intelligence, image processing, deep learning, data mining, and metaheuristics search algorithms. Prof. Sheta has published over 180 research papers in top-tier journals, conference proceedings, and six book chapters. He also published two books, Landmine Detection and Classification and Image Reconstruction of a Manufacturing Process, by LAP LAMBERT Academic Publishing. He is also the co-editor of the book" Business Intelligence and Performance Management - Theory, Systems, and Industrial Applications" by Springer Verlag, United Kingdom, published in March 2013. He is a senior IEEE member and Associate Editor of the International Journal of Advanced Computer Science and Applications (IJACSA) and the International Journal of Computational Complexity and Intelligent Algorithms. He received funding from many national and international agencies in Egypt, Saudi Arabia, Jordan, and the NSF USA.