

Global Look on Digital Health from the Heart of Europe, Technische Hochschule Deggendorf ,  
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# **Keynote Lecture**

## **Transformative Role of Machine Learning in Digital Health and Medical Diagnosis in the 21st Century**

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Machine learning (ML) is a key and increasingly pervasive technology in the 21<sup>st</sup> century. It is going to impact the way people live and work in a significant way. This lecture starts with an overview of the key ML concepts and different types of ML algorithms. In general, machine learning algorithms simulate the way brain learns and solves an estimation/recognition problem. They usually require a learning phase to discover the patterns among the available data, similar to the humans. An expanded definition of ML is advanced as algorithms that can learn from examples and data and solve seemingly intractable learning and unteachable problems, referred to as ingenious artificial intelligence (AI). Next, recent and innovative applications of ML in various fields and projects currently being pursued by leading high-tech companies such as Google, IBM, Uber, Baidu, Facebook, Pinterest, and Tesla are reviewed. Then, machine learning algorithms developed by the author and his associates are briefly described. Finally, examples of automated EEG-based diagnosis of various neurological and psychiatric disorders such as epilepsy, the Alzheimer's disease, Parkinson's disease, autism spectrum disorder, and Attention Deficit Hyperactivity Disorder (ADHD) developed by the authors and his associates over the past decade are presented.



**Hojjat Adeli** received his Ph.D. from Stanford University in 1976 at the age of 26. He is currently an Academy Professor at The Ohio State University where he held the Abba G. Lichtenstein Professorship for ten years. He is the Editor-in-Chief of the international journals **Computer-Aided Civil and Infrastructure Engineering** which he founded in 1986 and **Integrated Computer-Aided Engineering** which he founded in 1993. He has also served as the Editor-in-Chief of the **International Journal of Neural Systems** since 2005. He has been an Honorary Editor, Advisory Editor, or member of the Editorial Board of 144 research journals. He has authored over 600 research and scientific publications in various fields of computer science, engineering, applied mathematics, and medicine, including 16 ground-breaking high-technology books. He is the recipient of 66 awards and honors including five Honorary Doctorates, membership in four European academies, and Honorary Professorship at several Asian and European Universities. He is a Distinguished Member of American Society of Civil Engineers (ASCE), and a Fellow of AAAS, IEEE, AIMBE, and American Neurological Association. He was profiled as an *Engineering Legend* in the journal *Leadership and Management in Engineering*, ASCE, April 2010, by a noted biographer of legendary engineers.