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Machine Learning Cases in Clinical and Biomedical Domains

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Abstract

The aim of this paper is twofold: Firstly, to provide introductory knowledge to the reader who has little or no knowledge of machine learning with examples of applications in clinical and biomedical domains, and secondly, to compare and contrast the concept of Artificial Neural Network (ANN) and the Qur'anic concept of intellect (aql) in the Qur'an. Learning algorithm can generally be categorised into supervised and unsupervised learning. To better understand the machine learning concept, hypothetical data of glaucoma cases are presented. ANN is then selected as an example of supervised learning and the underlying principles in ANN are presented with general audience in mind with an attempt to relate the mechanism employed in the algorithm with Qur'anic verses containing the verbs derived from aql. The applications of machine learning in clinical and biomedical domains are briefly demonstrated based on the author's own research and most recent examples available from University of California, Irvine Machine Learning Repository. Selected verses which indicate motivation to use the intellect in positive manners and rebuke to those who do not activate the intellect are presented. The evidence found from the verses suggests that ANN shares similar learning process to achieve belief (iman) by analysing the similitudes (amsal) introduced to the algorithm.

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