A Deep Learning Approach to Case Based Reasoning to the Evaluation and Diagnosis of Cervical Carcinoma

**José Neves, Henrique Vicente, Filipa Ferraz,
Ana Catarina Leite, Ana Rita Rodrigues, Manuela Cruz,
Joana Machado, João Neves and Luzia Sampaio**

Abstract Deep Learning (DL) is a new area of Machine Learning research introduced with the objective of moving Machine Learning closer to one of its original goals, i.e., Artificial Intelligence (AI). DL breaks down tasks in ways that makes all kinds of machine assists seem possible, even likely. Better preventive healthcare, even better recommendations, are all here today or on the horizon.

J. Neves (✉) · H. Vicente · F. Ferraz
Centro Algoritmi, Universidade do Minho, Braga, Portugal
e-mail: jneves@di.uminho.pt

H. Vicente
e-mail: hvicente@uevora.pt

F. Ferraz
e-mail: filipatferraz@gmail.com

H. Vicente
Departamento de Química, Escola de Ciências e Tecnologia,
Universidade de Évora, Évora, Portugal

A. C. Leite · A. R. Rodrigues · M. Cruz
Departamento de Informática, Universidade do Minho, Braga, Portugal
e-mail: anacleite@gmail.com

A. R. Rodrigues
e-mail: anaritavvr@gmail.com

M. Cruz
e-mail: manuelavalecruz@gmail.com

J. Machado
Farmácia de Lamaçães, Braga, Portugal
e-mail: joana.mmachado@gmail.com

J. Neves
Mediclinic Arabian Ranches, PO Box 282602, Dubai, UAE
e-mail: joaocpneves@gmail.com

L. Sampaio
Dubai Healthcare City, PO Box 118855, Dubai, UAE
e-mail: luzia.sampaio@dbaj.ae

However, keeping up the pace of progress will require confronting currently AI's serious limitations. The last but not the least, Cervical Carcinoma is actuality a critical public health problem. Although patients have a longer survival rate due to early diagnosis and more effective treatment, this disease is still the leading cause of cancer death among women. Therefore, the main objective of this article is to present a DL approach to Case Based Reasoning in order to evaluate and diagnose Cervical Carcinoma using Magnetic Resonance Imaging. It will be grounded on a dynamic virtual world of complex and interactive entities that compete against one another in which its aptitude is judged by a single criterion, the Quality of Information they carry and the system's Degree of Confidence on such a measure, under a fixed symbolic structure.