An Artificial Neuronal Network Approach to Diagnosis of Attention Deficit Hyperactivity Disorder

Sónia Pereira, Sabino Gomes
CCTC, Universidade do Minho
Braga, Portugal
{soniapereira92, sabinogomes.antonio}@gmail.com

Jorge Ribeiro
Escola Superior de Tecnologia e Gestão
Instituto Politécnico de Viana do Castelo
Viana do Castelo, Portugal
jribeiro@estg.ipvc.pt

Henrique Vicente
Departamento de Química, Centro de Química de Évora
Escola de Ciências e Tecnologia, Universidade de Évora
Évora, Portugal
hvicente@uevora.pt

António Abelha, Paulo Novais, José Machado, José Neves*
CCTC, Universidade do Minho
Braga, Portugal
{abelha, pjon, jmac, jneves}@di.uminho.pt
* Corresponding author: phone: +351-934201337; fax: +351-253604471; e-mail: jneves@di.uminho.pt

Abstract—On the one hand about 3% to 12% of school-aged children present Attention Deficit Hyperactivity Disorder (ADHD), a situation that is characterized by attention deficit, impulsiveness and restlessness, coming from a change in the neurotransmitters of the central nervous system, caused by psychological messes, environment effects or genetic characteristics. One the other hand, when one´s aim is the prediction of ADHD in children and teenagers, we need to be able to handle incomplete or default data, like the one in ActiGraph´s images that may exhibit potential disordered sleep patterns. Indeed, using a new approach to knowledge representation and reasoning based on Logic Programming, complemented with a computational framework based on Artificial Neural Networks, ActiGraph's pioneering actigraphy monitoring systems may deliver, on the fly, real world information about sleep/wake behavior, circadian rhythms, daytime physical activity, and environmental light intensity for the study and clinical assessment of sleep disorders and the relationship between sleep and chronic disease.

Keywords—*ActiGraph´s Images; Attention Deficit Hyperactivity Disorder; Logic Programming; Knowledge Representation and Reasoning; Artificial Neuronal Networks.*