



POSSIBILISTIC LVQ NEURAL NETWORK – AN APPLICATION TO CHILDHOOD AUTISM GRADING

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Abstract: Psychological disorders are generally assessed by screening, behavioral features shown by the human. This challenges its accurate differential diagnosis and, is also error-prone when there are improper, insufficient clinical data and lack of clinical expertise. Thus, neural network based assistances in predicting and assessing psychological disorders have gained much interest. Childhood autism is a Neuro-psychiatric developmental disorder that impairs mainly three functional areas in a child: social, communication and behavior. This article demonstrates the application of a Possibilistic-Linear Vector Quantization ‘Po-LVQ’ neural network for the preliminary screening and grading of childhood autistic disorder. The diagnostic system assesses the grades as: ‘Normal’, ‘Mild-Moderate’, ‘Moderate-Severe’, ‘Severe’. It is able to perform with an improved overall accuracy of 95% exactly agreeing to the diagnostic criteria. Results of other performance parameters are also good enough to support the existing works about the applicability of neural network in autism diagnosis. Hence this research proposes a Po-LVQ based assessment support system for the diagnostic confirmation in grading childhood autism, during uncertain diagnosis due to lack of expertise. This helps to reduce the frustration and lengthy delays experiencing to parents before obtaining an accurate diagnostic result.

Key words: *childhood autism, Possibilistic-linear vector quantization, artificial intelligence, artificial neural networks, assessment support system*

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1. Introduction

A computerized evidence based decision assist system enhances the quality and efficiency in clinical decision making through diagnostic assistances. These systems are designed to support or confirm clinical decisions rather than making the decisions for the user [5]. Many times a patient data is imprecise, uncertain and vague due to incomplete patient history or unnoticed symptoms. The theoretical

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