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Automated assessment of early autism

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Autism spectrum disorder (ASD) is usually diagnosed in early childhood, but genetic detection of this brain disorder could mean more timely interventions that improve life for the patient and their carers. Research published in the *International Journal of Data Mining and Bioinformatics*, suggests that machine learning might be used to analyze genetic data that points to an ASD diagnosis before symptoms become obvious.

Fuad Alkoot of PAAET in Kuwait, and Abdullah Alqallaf of Kuwait University, Kuwait, explain that unlike other conditions, such as cancer, little heed has been taken to the possibility of early genetic detection of autism. This is despite the fact that an early diagnosis could be very useful to parents and carers. The team has now developed a four-stage computerized neural network system for testing simplified genetic data. The system traces between 150 and 500 features present on different chromosomes and known to be associated with ASD when certain genetic patterns are present.

The team points out that symptoms in ASD increase as the child gets older and so earlier diagnosis can offer the opportunity of treatment that might ameliorate some problems associated with the condition. At present, diagnosis relies only on expert assessment by a medical specialist. However, ambiguous symptoms in the early stages may well preclude a definitive diagnosis. In contrast, the inclusion of genetic characteristics strongly correlated with ASD in the diagnostic process might offer a stronger diagnosis or putatively rule out autism in a given case. This approach could also have implications for a better

understanding of how ASD arises, particularly as current theory suggests a mixture of genetic and environmental factors are involved.

"The implementation of such a system will lead to early intervention and enable us to detect if a subject has the potential to develop autism using the subjects' gene data, even before any behavioural symptoms start to appear," the team reports.

More information: Fuad M. Alkoot et al. Investigating machine learning techniques for the detection of autism, *International Journal of Data Mining and Bioinformatics* (2016). DOI: 10.1504/IJDMB.2016.10000981

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