Quantitative phenotyping to automate diagnosis of autism spectrum disorder (ASD)

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Technology description

Using machine learning to identify features of ASD

Market Need

Autism spectrum disorder is a developmental disorder that affects communication and behavior. Usually, the disorder is first detected through observation within the first 36 months of age looking for specific developmental milestones. Usually, it is the parents who first raise concerns of their child’s unusual behavior, such as not responding to their name or not making eye contact, which leads to further evaluation. After the doctor refers the child to a developmental specialist further evaluations are done by a multi-disciplinary team of doctors including psychologists, speech and language pathologists, and occupational therapists. Currently, the diagnosis process is subjective and involves multiple visits to the hospital with a range of specialists. If families have limited access to these providers a diagnosis could be delayed by months or even years, which could decrease the effectiveness of early behavioral interventions on the child. Thus, there is a great need for a faster and more objective means of screening for ASD.

Technology Overview

The Schultz Lab, located in CHOP’s Center for Autism Research, has harnessed the power of machine learning and classification to develop a tool that can quantify audio and facial features of ASD patients during a short conversation and use that information to predict if a subject has ASD. The device operates on the premise that patients with ASD often have trouble with mirror behaviors during conversation and carrying a conversation in an interaction with another subject. The algorithm analyzes on a granular level parameters such as speech, language, vocal acoustics, heart rate variability, pupillary responses, facial motion, eye gaze behavior and more and is able to classify, identify, and correlate the features that define ASD patients during a conversation.

Application area

- Diagnosis of ASD patients in various settings: hospital, school, day-care setting
- Diagnosis of other disorders in which an observable phenotype can be extracted during an interaction between two subjects

Advantages

• Objective diagnosis of ASD
• Quick- Diagnosis can be made within 3 minutes of a conversation

Institution

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