

POPULAR SCIENTIFIC SUMMARY

Tell your story. Social communication in autism: computational approach

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Our speech is a key to the mind. There is more to what we say than many of us may think. After the written text or statement, we are able not only to recognize the unique style of the writer, but also, with the use of computational methods, the gender, age or socio-economic status of the author.

Recent research shows that artificial neural networks and natural language processing techniques identify elusive and/or non-obvious speech characteristics. Artificial intelligence is entering new areas of our lives. It is also slowly making its way in psychology and psychiatry.

This project aims to use deep learning models, a branch of artificial intelligence, and natural language processing in the analysis of speech of people with autism in comparison to healthy, typically developing people. We hope the results will increase our understanding of social communication in autism, in particular the pragmatic aspects of language.

Since vast research on narrative skills in autism has been conducted in male predominant groups, we would like to further investigate sex differences in narratives produced by people with autism. Is the speech of autistic girls different from that of autistic boys? Does it differ from the speech of typically developing girls? Or is it more like the speech of boys with typical development? Does it depend on the situational context? Do people with autism speak differently when they are to tell about personal experiences and differently when they tell a story depicted in pictures? Are we able to detect these differences using fully automated methods?

The research is intended to be a step towards the development of quantifiable and objective computational measures for linguistic characteristics in autism. The development of computational methods, including models based on deep neural networks, could improve clinical diagnostics of autism and screening. From a technical point of view, their use only requires a computer or a smartphone. Data processing can be simplified by automatic speech transcription. Detecting autism using computational models may in the future be quick and effective on a large scale, supporting the clinician in the decision-making process.