



Spring 2021 Colloquium

Department of Computer and Information Sciences

Eye-Tracking Evidence for Visual Processing Differences Can Aid Automated Autism Detection and Make the Web More Accessible

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Zoom Link: <https://temple.zoom.us/j/97008417476>

Abstract:

While the need to improve web accessibility for neurodiverse populations has been universally acknowledged, a designer's only option to accommodate the needs of web users with autism at present is to rely on guidelines that have not been empirically evaluated. At the same time, owing to the difficulty with diagnosing autism in adulthood, many adults who are on the spectrum do not have their condition formally recognized and cannot access support. This talk presents experiments using eye-tracking data to simultaneously address these two seemingly unrelated needs of adults with autism: improving the accessibility of web pages and obtaining an autism diagnosis in adulthood.



We record gaze data from adults with and without ASD while they are looking for information on web pages. We then use the gaze data to compare the two groups in terms of the efficiency and accuracy with which they find the target information within the web pages. The results suggest that the autism group invests more cognitive effort to achieve the same accuracy results as their neurotypical counterparts and that this is likely due to a sequential approach to information searching where more attention is allocated to peripheral page elements. Next, we hypothesize that the differences captured by the eye-tracking data can be used to train an autism detection classifier. Experiments with two separate pairs of groups show a consistent classification accuracy of around 74%. We discuss the implications of the produced evidence of visual processing differences in adults when searching for information in web pages for advancing accessibility research and autism screening.

Bio:

Victoria Yaneva is a Data Scientist at NBME (National Board of Medical Examiners, Philadelphia, USA) and a part-time Lecturer at the University of Wolverhampton (Wolverhampton, UK). With a bachelor's degree in Psychology from the University of Plovdiv, Bulgaria and a PhD in Natural Language Processing from the University of Wolverhampton, UK, Victoria's interests lie in various intersection between these two disciplines. Her current work includes research on text and web accessibility for people with autism and the use of eye tracking and machine learning for the automatic detection of autism in adults. At NBME, her work focuses on the use of NLP for educational assessment in the context of high-stakes clinical exams. More information about Victoria can be found at <http://www.victoriayaneva.info/>.