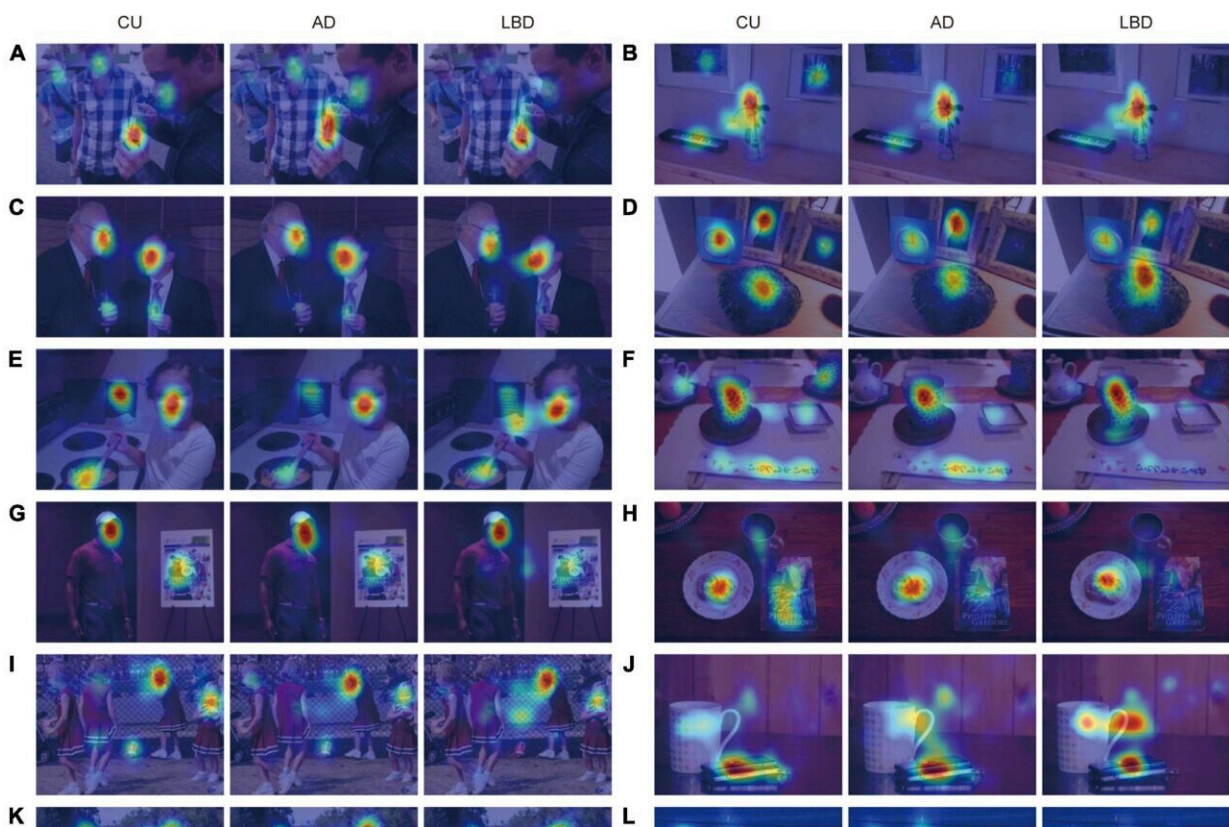


AI-based diagnostic tool differentiates dementia diseases by analysis of eye movement patterns

June 12 2024



Examples of complex scene images with gaze densities derived from the CU, AD, and LBD groups. Results show that AD and LBD patients focused on fewer locations (A–D), had different attention biases toward high-level semantic features (E–H), and looked more at the image center (I–L), compared with CU participants. Credit: *Frontiers in Neuroscience* (2024). DOI: 10.3389/fnins.2024.1333894

Eye movements can not only reflect impaired visual attention, but also influence cognitive processing and a wide range of daily activities. Hence, a better understanding of how patients with dementia visually perceive the real world is critically important to mitigate the widespread impact of impaired visual attention on their quality of life.

Furthermore, identifying disease-specific patterns of altered eye movement will provide behavioral biomarkers for differentiating dementia subtypes with similar clinical manifestations. However, previous studies have used structured tasks or restricted stimuli, which have limited the insights into how [eye movements](#) alter in and vary between different dementias in daily life.

In [a study](#) appearing in *Frontiers in Neuroscience*, researchers collected spontaneous viewing behaviors toward an exhaustive set of stimuli (200 images of complex naturalistic scenes containing 1,533 objects with annotations about their semantic attributes, such as faces, emotions, text, and human-made objects) from patients with Alzheimer's disease (AD) and dementia with Lewy bodies (DLB), the two most common subtypes of late-onset neurodegenerative dementias.

Through comprehensive characterization using a computational visual attention model, for the first time, the team showed disease-specific altered patterns of eye movement in response to complex scenes in patients with AD and DLB. They used these altered patterns to develop an AI-based screening tool capable of reliably identifying and differentiating patients with these two dementia forms.

These findings may assist us in comprehending real-world viewing behaviors in patients with dementia to mitigate the widespread impact of impaired [visual attention](#) on their daily activities. Additionally, the

language-free, instruction-free method proposed here for the objective characterization of free-viewing behaviors can support the screening and differentiation of dementia subtypes. This will greatly facilitate [dementia](#) research on a global level involving diverse populations with [different languages](#) or cognitive impairments that may affect the understanding of task instructions.

More information: Yasunori Yamada et al, Distinct eye movement patterns to complex scenes in Alzheimer's disease and Lewy body disease, *Frontiers in Neuroscience* (2024). [DOI: 10.3389/fnins.2024.1333894](#)

Provided by University of Tsukuba

Citation: AI-based diagnostic tool differentiates dementia diseases by analysis of eye movement patterns (2024, June 12) retrieved 18 June 2024 from <https://medicalxpress.com/news/2024-06-ai-based-diagnostic-tool-differentiates.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.