

# Diagnosis of neurodegenerative diseases through eye movements

June 13 2018

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A new robotic system developed by UPM researchers and AURA Innovative Robotics Company can help diagnose neurodegenerative diseases such as dementia and Parkinson's through the analysis of eye movements.

OSCANN Desk is a non-invasive technology developed by researchers from Universidad Politécnica de Madrid (UPM) and the company AURA Innovative Robotics, led by Cecilia García Cena that with a simple, fast [test](#) can provide data about brain function through the measurement of eye movements.

This new system is in the phase of clinical trial authorized by the Spanish Agency of Medicines and Medical Devices in six Spanish hospitals and, thanks to techniques of imaging processing and machine learning, its results will allow doctors to early diagnose [neurodegenerative diseases](#) and carry out customized treatments.

The diagnosis process of a neurodegenerative disease takes time since symptoms are complex to assess in the early stages of the disease. Besides, there are symptoms that are common to other neurodegenerative diseases such as tremors. High rates of diagnostic uncertainty make objective tests necessary to achieve an accurate medicine in which each patient receives information, prognosis and appropriate treatment.

The physiological process in medicine explains the eye movements.

Accurately measure these movements would provide real-time information about how the brain is working at that moment. From this premise and in order to achieve an early diagnosis of neurodegenerative diseases, researchers from Centre for Automation and Robotics (CAR) CSIC-UPM and AURA Innovative Robotics Startup Company have developed OSCANN desk, an assistant medical device that through techniques of image processing and machine learning is able to accurately assess the [eye movements](#).

Thanks to this new tool, doctors will have objective data of the brain functioning that, along with other clinical data, will enable accurate early diagnosis of the [disease](#).

The test is conducted in a health care center with no need for a second doctor's appointment. The patient sits comfortably in a chair and the device is adapted to his anatomy to precisely measure the eye [movement](#). The patient looks at stimuli that appear on a monitor, and each test lasts about a minute.

The clinical tests allowed researchers to develop models of pathologies, and by applying machine learning techniques, similarities and differences are analyzed among over 500 variables of eye movement. Likewise, the progress of certain symptoms can be objectively measured. This will help doctors to make a diagnosis and customize the treatment.

Today, the tests are applied to Alzheimer's, Parkinson's, mild cognitive impairment, diverse dementias, multiple sclerosis, and others. Additionally, researchers are collaborating on other clinical studies such as those for autistic spectrum disorders, epilepsy, diabetes, alcoholism, migraines, depression and bipolar disorder. This tool is being used in six hospitals that are national reference centers in pathologies.

In the near future, OSCANN Desk will be working in HM Hospitals, specifically in the Memory Disorders Unit of HM CINAC located at the Hospital Universitario HM Madrid.

Provided by Universidad Politécnica de Madrid

Citation: Diagnosis of neurodegenerative diseases through eye movements (2018, June 13) retrieved 5 February 2024 from <https://medicalxpress.com/news/2018-06-diagnosis-neurodegenerative-diseases-eye-movements.html>

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