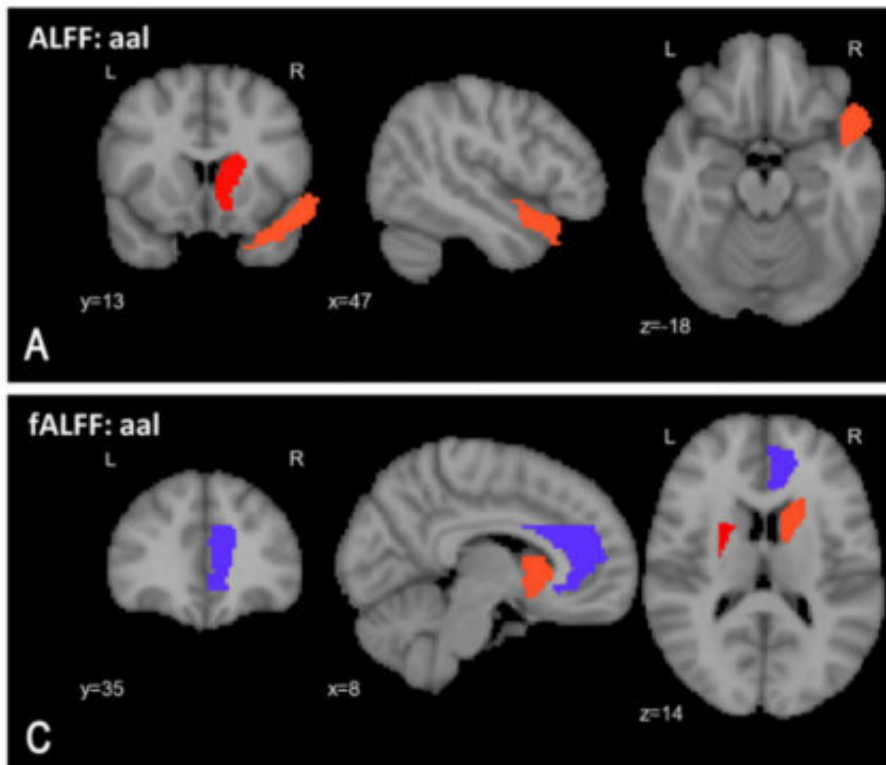


# Improved AI-based tool increases accuracy of schizophrenia diagnosis

January 31 2019, by Andrew Lyle



Some of the most reliable indicators of schizophrenia the new diagnostic tool found are highlighted in this image. Red indicates elevated activity and blue indicates suppressed activity in the brain. Credit: Sunil Kalmady

A tool developed by University of Alberta researchers using machine learning diagnoses schizophrenia more accurately than other AI-based systems, according to a new study.

The tool, called EMPaSchiz (Ensemble algorithm with Multiple Parcellations for Schizophrenia prediction), examined [brain scans](#) from patients who were diagnosed with schizophrenia and predicted the diagnosis with 87 per cent accuracy.

The finding follows on a previous study in 2017 in which U of A and IBM researchers developed a tool capable of predicting schizophrenia with 74 per cent accuracy, and a study last year in which [medical researchers](#) used machine learning to predict with 82 per cent accuracy whether a patient would respond to risperidone, an antipsychotic medication.

"Schizophrenia is characterized by a constellation of symptoms that might co-occur in patients. Two individuals with the same diagnosis might still present different symptoms. This often leads to misdiagnosis," said Sunil Kalmady, a post-doctoral fellow at the U of A who led the study.

"Machine learning, in this case, is able to drive an evidence-based approach that looks at thousands of features in a brain scan to lead to an optimal prediction," added Kalmady.

"Moreover, there are ways to estimate how accurate this tool will be and how often it will provide the correct diagnosis," said computing scientist Russ Greiner, who supervised Kalmady's research along with psychiatry professor Andrew Greenshaw.

The researchers noted EMPaSchiz is one of the first [machine learning](#) tools trained exclusively on data from patients who were diagnosed but not yet taking any medication to treat their illness, which could make it more valuable in the early stages of diagnosis.

"Mental health disorders are highly complex in terms of causes and

manifestation of symptoms," said Greenshaw. "Machine learning and future AI are approaches that enable a multi-dimensional, data-driven inroad that captures the level of complexity and objectivity that we need to unravel the wicked problems of understanding mental illness."

The paper, "Towards Artificial Intelligence in Mental Health by Improving Schizophrenia Prediction With Multiple Brain Parcellation Ensemble-Learning," was published in *NPJ Schizophrenia*.

**More information:** Sunil Vasu Kalmady et al. Towards artificial intelligence in mental health by improving schizophrenia prediction with multiple brain parcellation ensemble-learning, *npj Schizophrenia* (2019). DOI: [10.1038/s41537-018-0070-8](https://doi.org/10.1038/s41537-018-0070-8)

Provided by University of Alberta

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