

# Anomaly detection

In [data analysis](#), anomaly detection (also referred to as outlier detection and sometimes as novelty detection) is generally understood to be the identification of rare items, events, or observations that deviate significantly from the majority of the [data](#) and do not conform to a well-defined notion of normal behavior.

Zhang et al. introduced an individual-level structural [anomaly detection](#) method for [glioma](#) patients and proposed several [abnormality](#) indexes to depict individual [atrophy](#) patterns. Forty-five patients with a glioma in the [frontal lobe](#) and fifty-one age-matched healthy controls participated in the study. Individual structural abnormality maps (SAM) were generated using patients' preoperative [T1](#) images, by calculating the degree of deviation of [voxel volume](#) in each patient with the normative model built from healthy controls. Based on SAM, a series of individual abnormality indexes were computed, and their relationship with glioma characteristics was explored. The results demonstrated that glioma patients showed unique non-tumoral atrophy patterns with overlapping atrophy regions mainly located in the [hippocampus](#), [parahippocampus](#), [amygdala](#), [insula](#), [middle temporal gyrus](#) and [inferior temporal gyrus](#), which are closely related to the human [cognitive functions](#). The abnormality indexes were associated with several [molecular biomarkers](#) including [isocitrate dehydrogenase](#) (IDH) mutation, [1p/19q co-deletion](#) and telomerase reverse transcriptase ([TERT](#)) promoter mutation. The study provides an effective way to access the individual-level non-tumoral structural abnormalities in glioma patients, which has the potential to significantly improve individualized [precision medicine](#) <sup>1)</sup>.

<sup>1)</sup>

Zhang G, Zhang X, Huang H, Wang Y, Li H, Duan Y, Chen H, Liu Y, Jing B, Tie Y, Lin S. Probing individual-level structural [atrophy](#) in [frontal glioma](#) patients. Neurosurg Rev. 2022 May 4. doi: 10.1007/s10143-022-01800-9. Epub ahead of print. PMID: 35508819.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

[https://neurosurgerywiki.com/wiki/doku.php?id=anomaly\\_detection](https://neurosurgerywiki.com/wiki/doku.php?id=anomaly_detection)

Last update: **2025/04/29 20:28**

