

# Alzheimer's Discrimination Analysis

## Fully Automatic Analysis of FDG Scans from Patients with Suspected AD

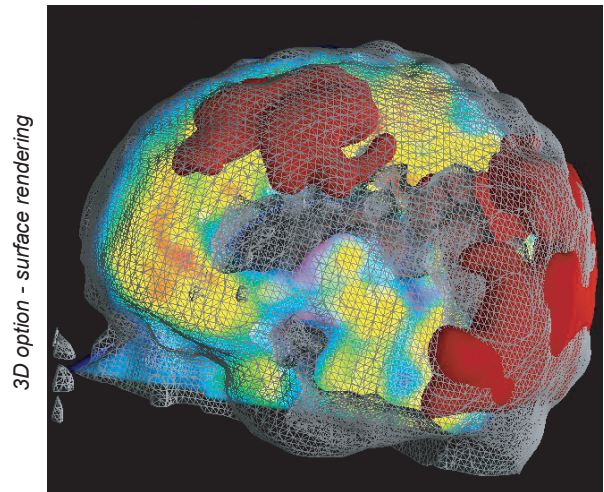
Based on the FDG data acquired in a large multi-center trial Herholz et al. have developed a methodology for the discrimination between Alzheimer Dementia (AD) and normal controls [1].

The PALZ tool is an authorized implementation of this methodology. Given the FDG data of patients with suspected AD the program performs a fully automatic discrimination analysis. The outcome is documented in a report showing the brain areas with significant uptake reduction ( $p < 0.05$ ) and stating a criterion of scan abnormality together with its error probability. In conjunction with clinical symptoms, an abnormal finding supports the diagnosis of AD. Our users report that PALZ performs very reliably in a productive environment.

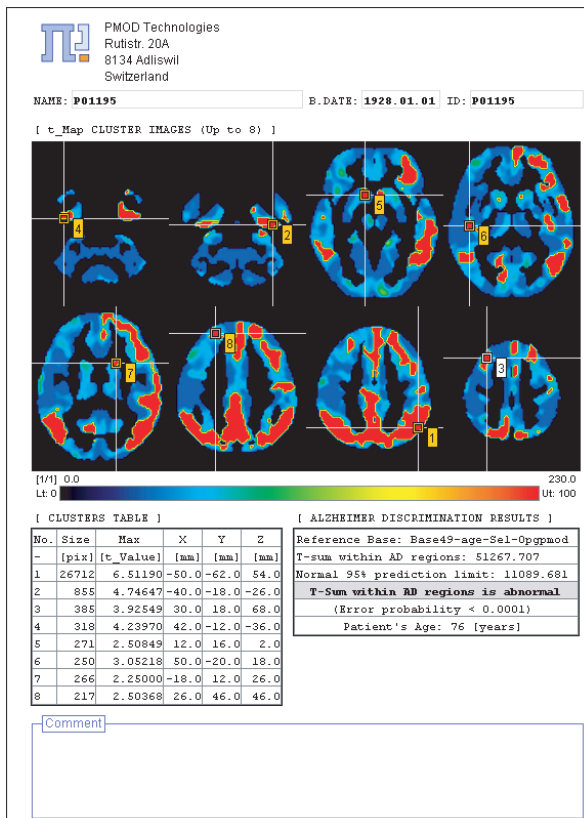
[1] K. Herholz, E. Salmon, D. Perani, et al., *Discrimination between Alzheimer Dementia and Controls by Automated Analysis of Multicenter FDG PET*. *NeuroImage* 17, 302-316 (2002).

## 3D Exploration of Areas with Reduced Uptake

An intuitive way to explore the results is facilitated by the optional 3D tool. When started from the PALZ tool it immediately converts the clusters with reduced uptake into surface rendered objects. The user can then easily manipulate the scene to get an understanding of the spatial arrangement. For instance, he can interactively rotate the objects and integrate them with planes showing the patient images.



Report composed of images and discrimination results



## Statistical Discrimination Criterion

The processing sequence resulting in the discrimination criterion starts with the stereotactic normalization of the patient images. The resulting pixel values are then age corrected and compared with the values found for the normal controls. Taking into account the distribution of normal values, t-values can be derived. All abnormal t-values in an AD-specific mask are summed, resulting in the AD-t sum criterion. As the distribution of the AD t-sum has been assessed in the control group, a 95% prediction limit and error probabilities can be calculated. It has been shown to be a highly sensitive indicator of scan abnormality with a 93% sensitivity.

### DISCLAIMER

- THE PMOD ALZHEIMER'S DISCRIMINATION ANALYSIS (PALZ) TOOL HAS NO APPROVAL FOR CLINICAL USE.
- THEREFORE, THE PALZ TOOL MAY ONLY BE USED FOR RESEARCH OR INVESTIGATIONAL PURPOSES.