

#### VISION TRANSFORMERS FOR THE PREDICTION OF MILD COGNITIVE IMPAIRMENT TO ALZHEIMER'S DISEASE PROGRESSION USING MID-SAGITTAL SMRI

The results obtained in this study outperform previous reports using the ADNI collection, and it suggests that sMRI-based ViT could be efficiently applied with a considerable potential benefit for AD patient management.

#### COMPARISON OF ANATOMICAL AND DIFFUSION MRI FOR DETECTING PARKINSON'S DISEASE USING DEEP CONVOLUTIONAL NEURAL NETWORK

Although tests on more diverse data are warranted, deep-learned models from dMRI show promise for PD classification, and supports the use of diffusion-weighted images as an alternative to anatomical images for AI-based detection of Parkinson's disease.

#### SELF-SUPERVISED CONTRASTIVE LEARNING TO PREDICT ALZHEIMER'S DISEASE PROGRESSION WITH 3D AMYLOID-PET

A self-supervised contrastive learning method to predict AD progression with 3D amyloid-PET that uses unlabeled data to capture general representations underlying the images and is capable of providing appropriate data representations, resulting in accurate classification.

#### VALIDATION OF AUTOMATED HIPPOCAMPUS VOLUME ASSESSMENT USING DEEP LEARNING CONVOLUTIONAL NEURAL NETWORKS IN PATIENTS WITH ALZHEIMER'S DISEASE

This work was able to validate ADs hippocampal volume compared to age-matched healthy controls (HC) based on HippoDeep Model by comparing it with VBM as the reference standard by using VBM to compare sensitivity and specificity with the Hippo deep toolbox.

#### REVOLUTIONIZING ALZHEIMER'S DISEASE DIAGNOSIS USING DEEP LEARNING APPROACH

The proposed CNN-based system has the potential to improve early detection and monitoring of Alzheimer's disease, leading to improved patient outcomes, and is utilized to enhance patient care, lower expenses, and enable quick and accurate analysis in sizable investigations.

#### STRUCTURAL COMPLEXITY OF BRAIN REGIONS IN MILD COGNITIVE IMPAIRMENT AND ALZHEIMER'S DISEASE

It is shown that FD can be used to detect group differences between patients and healthy controls, with the former showing significantly reduced complexity across multiple brain regions, and the contribution of specific brain regions to individual-based classification adhered to previous literature on the properties of the brain memory network.

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#### DEEP LEARNING AND TRANSFER LEARNING FOR BRAIN TUMOR DETECTION AND CLASSIFICATION

An approach to brain tumor MRIs that is comparatively similar to that of trained radiologists while also exhibiting a high sensitivity to subtle structural changes resulting from the presence of a tumor is suggested.

#### PRE-TRAINED DEEP LEARNING MODELS FOR BRAIN MRI IMAGE CLASSIFICATION

Validation of the test set utilizing accuracy, recall, Precision, and F1 score showed that the pre-trained VGG-19 model with transfer learning exhibited the best performance.

#### SMART BRAIN TUMOR DIAGNOSIS SYSTEM UTILIZING DEEP CONVOLUTIONAL NEURAL NETWORKS

A Convolutional Neural Network (CNN)-based brain tumor diagnosis system using EfficientNetv2s architecture is established, which was improved with the Ranger optimization and extensive pre-processing and demonstrated a convincing performance in tumor detection and diagnosis.

#### HIGHER PERFORMANCE FOR WOMEN THAN MEN IN MRI-BASED ALZHEIMER'S

## DISEASE DETECTION

### ANALYSIS OF 2D AND 3D CONVOLUTION MODELS FOR VOLUMETRIC SEGMENTATION OF THE HUMAN HIPPOCAMPUS

2D convolution models can surpass their 3D counterparts in terms of both hippocampus segmentation performance and training efficiency, and demonstrate potential savings of thousands of clinician person-hours spent on manually analyzing and segmenting brain MRI scans.

### GLACIER: GLASS-BOX TRANSFORMER FOR INTERPRETABLE DYNAMIC NEUROIMAGING.

This work presents a 'glass-box' deep learning model that mixes spatial and temporal dimensions in succession to estimate dynamic connectivity between the brain's intrinsic networks and estimates task-based flexible connectivity matrices, unlike static methods such as Pearson's correlation coefficients.

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### SYMMETRIC DATA-DRIVEN FUSION OF DIFFUSION TENSOR MRI: AGE DIFFERENCES IN WHITE MATTER

### EXTENSIVE T1-WEIGHTED MRI PREPROCESSING IMPROVES GENERALIZABILITY OF DEEP BRAIN AGE PREDICTION MODELS

The results show that extensive T1w preprocessing, with higher degree of freedom in T1W to atlas registration and extensive grayscale corrections, and bias correction improve the generalization of brain age models' performances when applied on new unseen datasets.

### TRANSFER LEARNING ON STRUCTURAL BRAIN AGE MODELS TO DECODE COGNITION IN MS: A FEDERATED LEARNING APPROACH

### COMPARATIVE STUDY FOR DETECTION OF EARLY-STAGE ALZHEIMER'S DISEASE USING RESERVOIR COMPUTING

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### CARDIAC AGE PREDICTION USING GRAPH NEURAL NETWORKS

A generalisable framework for modelling three-dimensional motion as a graph and how graph representations of complex motion can efficiently predict biologically meaningful outcomes is developed.

### BIG FIELD OF VIEW MRI T1W AND FLAIR TEMPLATE - NMRI225

A new template based on 225 T1w and FLAIR images with a big field-of-view that can serve both as target for across subject spatial normalization as well as a basis to build high-resolution head models is constructed.

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### 3D CAPSULE NETWORKS FOR BRAIN IMAGE SEGMENTATION

A capsule network is developed and validated that is effective in segmenting brain images, can segment images that are not well-represented in the training data, and is computationally efficient compared with alternatives.

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#### EFFICIENT 3D MEDICAL IMAGE SEGMENTATION USING COTR: BRIDGING CNN AND TRANSFORMER

A novel framework is presented for accurately segmenting 3D medical images based on the combination of a convolutional neural network and a transformer (CoTr), which allows us to construct CNNs for extracting feature representations, and Vision Transformers for modelling longrange dependency on the extracted feature maps.

#### THE INFLUENCE OF BRAIN MRI DEFACING ALGORITHMS ON BRAIN-AGE PREDICTIONS VIA 3D CONVOLUTIONAL NEURAL NETWORKS

4 popular defacing methods were evaluated to identify the effects of defacing on 'brain age' prediction and obtained better performance in age prediction when using the extracted face portion alone than images of the brain, suggesting the need for caution when defaced methods are used in medical image analysis.

#### LEVERAGING UNLABELLED DATA IN MULTIPLE-INSTANCE LEARNING PROBLEMS FOR IMPROVED DETECTION OF PARKINSONIAN TREMOR IN FREE-LIVING CONDITIONS

A new method for combining semi-supervised with multiple-instance learning, based on the Virtual Adversarial Training principle, is introduced, which can achieve large performance gains in per-subject tremor detection for a cohort of 45 subjects with known tremor ground-truth.

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#### A NOVEL APPROACH UTILIZING MACHINE LEARNING FOR THE EARLY DIAGNOSIS OF

#### ALZHEIMER'S DISEASE

A machine learning model that comprises GaussianNB, Decision Tree, Random Forest, XGBoost, Voting Classifier, and GradientBoost is proposed to predict Alzheimer's disease and showed that the voting classifier attained the highest validation accuracy of 96% for the AD dataset.

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#### SURVEY OF RECENT DEEP NEURAL NETWORKS WITH STRONG ANNOTATED SUPERVISION IN HISTOPATHOLOGY

In this paper, recent DL-based classification studies in histopathology using strongly annotated data have been reviewed and the classification of reviewed works into tissue classification, tissue grading, and biomarker identification was used.

#### IMAGE CLASSIFICATION USING CONVOLUTIONAL NEURAL NETWORKS

A comprehensive review of CNN-based image classification methods, covering various aspects such as network architectures, training techniques, and evaluation metrics is provided.

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#### SEEING BEYOND THE SYMPTOMS: BIOMARKERS AND BRAIN REGIONS LINKED TO COGNITIVE DECLINE IN ALZHEIMER'S DISEASE

The results demonstrated that different biomarkers could predict all three cognitive scores, and the most associated features with the cognitive scores were identified, including the right transverse temporal based on Amyloid- $\beta$  ( $A\beta$ ) deposition.

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#### STRUCTURAL MRI TEXTURE ANALYSIS FOR DETECTING ALZHEIMER'S DISEASE

The proposed method to detect AD in 3 different stages, namely, control, mild-cognitive impairment, and AD itself, using structural magnetic resonance imaging (sMRI), surpasses by 4% the discrimination accuracy of the state-of-the-art methods that use structural MRI.

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