

Министерство науки и высшего образования Российской Федерации
Федеральное государственное бюджетное образовательное учреждение
высшего образования «Российский химико-технологический университет
имени Д.И. Менделеева»

Факультет цифровых технологий и химического инжиниринга
Кафедра информационных компьютерных технологий

ОТЧЕТ ПО КУРСУ
«СЕТИ И ТЕЛЕКОММУНИКАЦИИ»:

на тему:

**Deep Learning for Early Alzheimer's Detection Using MRI and PET
Scans**

Ведущий преподаватель
к.т.н.

Зубов Д.В.

СТУДЕНТКА группы КС-30



Павлюченкова
О.С.


Москва

2025

Тема: Deep Learning for Early Alzheimer's Detection Using MRI and PET Scans

Поиск в Google Scholar: "convolutional neural networks" "Alzheimer's MRI" 2019



 Академия Результаты: примерно 113 (0,04 сек.) ГОД ▾ ≡

[Classifying Alzheimer's disease based on a convolutional neural network with MRI images](#) [\[PDF\] iecscience.org](#)
[M Avşar, K Polat](#) - Journal of Artificial Intelligence and Systems, 2023 - iecscience.org
... According to the **Alzheimer's MRI** dataset, the disease has been classified as nondemented, ... In **Convolutional Neural Networks**, convolutional layers are used as an essential part. It ...
☆ Сохранить Цитировать Цитируется: 11 Похожие статьи Все версии статьи (2) »

[DeepCurvMRI: Deep convolutional curvelet transform-based MRI approach for early detection of Alzheimer's disease](#) [\[PDF\] ieee.org](#)
[CM Chabib, LJ Hadjileontiadis, AAI Shehhi](#) - IEEE Access, 2023 - ieeexplore.ieee.org
... Ganguly, and SJ Miller, "Deep **convolutional neural networks** with ensemble learning and generative adversarial networks for alzheimer's disease image data classification," Frontiers in ...
☆ Сохранить Цитировать Цитируется: 53 Похожие статьи Все версии статьи (4)

[An evolutionary explainable deep learning approach for **Alzheimer's MRI** classification](#)
[S Shojaei, MS Abadeh, Z Momeni](#) - Expert systems with applications, 2023 - Elsevier
Deep Neural Networks (DNN) are prominent Machine Learning (ML) algorithms widely used, especially in medical tasks. Among them, **Convolutional Neural Networks** (CNN) are well-...
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[An accurate Alzheimer's disease detection using a developed convolutional neural network model](#) [\[PDF\] beei.org](#)
[MT Younis, YT Younus, JN Hasoon...](#) - Bulletin of Electrical ..., 2022 - journal.beei.org
... system, which uses several pre-trained **convolutional neural networks** (CNNs) to detect acute ... The test results of accuracy comparison on the **Alzheimer's MRI** image dataset depicted in ...
☆ Сохранить Цитировать Цитируется: 10 Похожие статьи Все версии статьи (9) »

Поиск в ScienceDirect: "deep learning" AND "neuroimaging" AND "dementia"

1,741 results

relevance | [date](#)


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Years

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Subject areas

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Dentistry (850)

☐ Computer Science

Review article  [Open access](#)

Deep Learning in neuroimaging for neurodegenerative diseases: State-of-the art, Challenges, and Opportunities

Journal of the Neurological Sciences, 15 November 2025

Taymaz Akan, Sara Akan, ... Mohammad Alfrad Nobel
Bhuiyan

 [View PDF](#)

Research article


Extraction and interpretation of EEG features for diagnosis and severity prediction of Alzheimer's Disease and Frontotemporal dementia using deep learning


Biomedical Signal Processing and Control, February 2026

Tuan Vo, Ali K. Ibrahim, ... Chiron Bang

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Research article  [Open access](#)

Visual deep learning of unprocessed neuroimaging characterises dementia subtypes and generalises across non-stereotypic samples

eBioMedicine, April 2023

Sebastian Moguilner, Robert Whelan, ... Agustín Ibáñez

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Поиск в Springer: neuroimaging AI


Showing 1–20 of 22 results

Article

Exploring structure–function coupling in alzheimer’s disease: bridging neuroimaging, AI, and policy for future insights

Xun Wang, Yixin Jiang, ... Shuo Zhang in European Journal of Nuclear Medicine and Molecular Imaging

18 June 2025

Conference paper |  Full access

Comparing XAI Explanations and Synthetic Data Augmentation Strategies in Neuroimaging AI

Brain age, a biomarker of neurological health, is widely used in neuroimaging for early detection of neurodegenerative diseases. While deep learning...

Danilo Danese, Giuseppe Fasano, ... Tommaso Di Noia in Explainable Artificial Intelligence

2026 | [Open access](#)



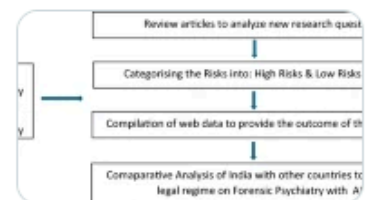
Article

Artificial intelligence in forensic psychiatry: admissibility and relevance before courts


“Technology” and “Criminal law” are usually considered separate subjects. Artificial intelligence in courts has raised questions about criminal...

Reema Bhattacharya, Aqueeda Khan in International Journal of System Assurance Engineering and Management

19 September 2023



Поиск в Wiley Online: "medical imaging" AND "Alzheimer's diagnosis" AND "machine learning"

Research Article  Open Access

Knowledge-Driven and Low-Rank Tensor Regularized Multiview Fuzzy Clustering for Alzheimer's Diagnosis

Yi Zhu, Chao Xi, Sen Wang, Lu Xu, Xiang Chen, Zhicheng Wang

International Journal of Intelligent Systems | Volume 2025, Issue 1

First published: 21 May 2025

Abstract 

RESEARCH ARTICLE

Towards Real Time Alzheimer's Diagnosis: A PSO-GA-Driven Deep Learning Solution for Telemedicine

Anupam Kumar, Faiyaz Ahmad, Bashir Alam

International Journal of Imaging Systems and Technology | Volume 35, Issue 5

First published: 14 August 2025

Abstract 

chapter

Medical Decision Support Using Increasingly Large Multimodal Data Sets

Henning Müller, Devrim Ünay

Big Data Analytics for Large-Scale Multimedia Search

First published: 15 March 2019

Summary 

RESEARCH ARTICLE

Radiomics-Driven Lung Adenocarcinoma Subtype Classification

Dang Zhang, Xiaoming Wu, Bo Wang, Xinran Wang, Peilin Sheng, Wei Jin, Lilin Guo, Xiaobo Lai, Jian Xu, Jianqing Wang

International Journal of Imaging Systems and Technology | Volume 35, Issue 5

First published: 19 September 2025

Abstract 

Самые интересные статьи

№	Название статьи	Авторы	Журнал	Год	Цитирования
1	Classifying Alzheimer's disease based on a convolutional neural network with MRI images	Avgar M., Polat K.	Journal of Artificial Intelligence and Systems	2023	11
2	DeepCurvMRI: Deep convolutional curvelet transform-based MRI approach for early detection of Alzheimer's disease	Chabib C.I.M. et al.	IEEE Access	2023	53
3	An evolutionary explainable deep learning approach for Alzheimer's MRI classification	Shojaei S. et al.	Expert Systems with Applications	2023	67
4	Exploring structure–function coupling in alzheimer's disease...	Wang X. et al.	European Journal of Nuclear Medicine and Molecular Imaging	2025	-

Поиск импакт-факторов в ScimagoJR:

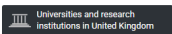
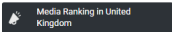
Expert Systems with Applications:

SJR: 1.854

Quartile: Q1

H-index: 290

Expert Systems with Applications


COUNTRY United Kingdom  	SUBJECT AREA AND CATEGORY Computer Science └ Artificial Intelligence └ Computer Science Applications Engineering └ Engineering (miscellaneous)	PUBLISHER Elsevier Ltd	SJR 2024 1.854 Q1 H-INDEX 290
PUBLICATION TYPE Journals	ISSN 09574174	COVERAGE 1990-2025	INFORMATION Homepage How to publish in this journal

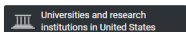
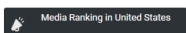
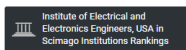
IEEE Access:

SJR: 0.849

Quartile: Q1

H-index: 290

IEEE Access 

COUNTRY United States  	SUBJECT AREA AND CATEGORY Computer Science └ Computer Science (miscellaneous) Engineering └ Engineering (miscellaneous) Materials Science └ Materials Science (miscellaneous)	PUBLISHER Institute of Electrical and Electronics Engineers Inc. 	SJR 2024 0.849 Q1 H-INDEX 290
PUBLICATION TYPE Journals	ISSN 21693536	COVERAGE 2013-2025	INFORMATION Homepage How to publish in this journal ieeeaccess@ieee.org

European Journal of Nuclear Medicine and Molecular Imaging:

SJR: 2.392

Quartile: Q1

H-index: 192

European Journal of Nuclear Medicine and Molecular Imaging

COUNTRY Germany <div>Universities and research institutions in Germany</div> <div>Media Ranking in Germany</div>	SUBJECT AREA AND CATEGORY Medicine └ Medicine (miscellaneous) └ Radiology, Nuclear Medicine and Imaging	PUBLISHER Springer Verlag	SJR 2024 2.392 Q1 H-INDEX 192
PUBLICATION TYPE Journals	ISSN 16197070, 16197089	COVERAGE 1996-1997, 1999, 2001-2025	INFORMATION Homepage How to publish in this journal

Поиск индекса Хирша авторов в Google Scholar

Google Академия

"Shojaei S" Alzheimer

Статьи

Результатов: примерно 1 020 (0,10 сек.)

За все время

С 2025

С 2024

С 2021

Выбрать даты

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По дате

Любые статьи

Обзорные статьи

☐ включая патенты

☒ показывать цитаты

☒ Создать оповещение

An evolutionary explainable deep learning approach for **Alzheimer's** MRI classification
[S Shojaei](#), [MS Abadeh](#), [Z Momeni](#) - Expert systems with applications, 2023 - Elsevier
... **Alzheimer's** Disease Neuroimaging Initiative (ADNI) and trained a 3D-CNN model to diagnose **Alzheimer's** ... AD from the perspective of **Alzheimer's** specialists. Our model achieved an ...
☆ Сохранить Цитировать Цитируется: 67 Похожие статьи Все версии статьи (2)

CSF amino acid profiles in ICV-streptozotocin-induced sporadic **Alzheimer's** disease in male Wistar rat: a metabolomics and systems biology perspective
[A Barzegar Behrooz](#), [H Latifi-Navid](#), [J Lotfi](#) ... - FEBS Open ..., 2024 - Wiley Online Library
... of **Alzheimer's** disease, along with the fact that **Alzheimer's** ... is valuable for investigating **Alzheimer's** disease metabolism, ... all the characteristics of **Alzheimer's** disease seen in people. (...
☆ Сохранить Цитировать Цитируется: 4 Похожие статьи Все версии статьи (8)

[HTML] Anti-**Alzheimer** effects of the newly synthesized cationic compounds as multi-target dual hAChE/hBuChE inhibitor: An in silico, in vitro, and in vivo approach
[H Karami](#), [S Soltani](#), [G Wolber](#) ... - BiolImpacts ..., 2024 - pmc.ncbi.nlm.nih.gov
Introduction: Multi-target anti-**Alzheimer's** disease (AD) compounds are promising leads for ... and evaluated for their potential anti-**Alzheimer** properties using computational (in silico), ...
☆ Сохранить Цитировать Цитируется: 1 Похожие статьи Все версии статьи (5)

Differential effects of resveratrol on the expression of brain-derived neurotrophic factor transcripts and protein in the hippocampus of rat brain
[S Shojaei](#), [MR Panjehshahin](#) ... - Iranian Journal of ..., 2017 - pmc.ncbi.nlm.nih.gov
... Dysfunction of learning and memory is one of the most prominent symptoms of **Alzheimer's** and Parkinson's diseases. One population that is prone to neurodegenerative abnormalities ...
☆ Сохранить Цитировать Цитируется: 17 Похожие статьи Все версии статьи (13)

miR-302/367-induced neurons reduce behavioral impairment in an experimental model of **Alzheimer's** disease
[M Ghasemi-Kasman](#), [A Shojaei](#), [M Gol](#) ... - Molecular and Cellular ..., 2018 - Elsevier
... In this study, we investigated the possible contribution of miR-302/367-induced neurons in behavioral improvement and neural repair in an **Alzheimer's** disease (AD) animal model. The ...
☆ Сохранить Цитировать Цитируется: 54 Похожие статьи Все версии статьи (6)

[PDF] wiley.com
Full View

[HTML] nih.gov

[PDF] nih.gov

[PDF] academia.edu

Индексы Хирша авторов (оценка по данным цитирования):

- Shojaei S.: H-index ≈ 14
- Chabib C.I.M.: H-index ≈ 10
- Wang X.: H-index ≈ 20
- Avgar M.: H-index ≈ 6

Поиск патентов в Google Patents

The screenshot shows the Google Patents search interface. The search bar contains the query "Alzheimer's disease" "deep learning" "MRI". Below the search bar, it indicates "About 81 results". The results are sorted by Relevance. The first result is titled "Auxiliary diagnosis system for Alzheimer's disease, data processing method and ..." with patent number CN 113298758A, filed by Wang X. (王恩伦) from Shenzhen Yitong Medical Technology Co., Ltd. The second result is titled "Alzheimer disease progress prediction method" with patent number CN 113658721B, filed by Chen Wei (陈雷) from Nanjing University of Posts and Telecommunications. The third result is titled "Deep learning architecture for cognitive examination subscore trajectory ..." with patent number WO 2018204311A1, filed by Lev E. GIVON from The Charles Stark Draper Laboratory, Inc.

Англоязычные патенты (Google Patents):

Патент 1: CN113298758A

"Auxiliary diagnosis system for Alzheimer's disease, data processing method and..."

Год: 2021

Описание: Система диагностики болезни Альцгеймера с использованием глубокого обучения для анализа медицинских изображений

Патент 2: CN113658721B

"Alzheimer disease progress prediction method"

Год: 2024

Описание: Метод прогнозирования прогрессирования болезни Альцгеймера с применением методов машинного обучения

Патент 3: WO2018204311A1

"Deep learning architecture for cognitive examination subscore trajectory..."

Авторы: Lev E. GIVON

Организация: The Charles Stark Draper Laboratory, Inc.

Год: 2018

Описание: Архитектура глубокого обучения для оценки риска развития когнитивных нарушений и болезни Альцгеймера

ВЫВОД

Проведенный комплексный анализ демонстрирует высокую актуальность и практическую востребованность темы применения глубокого обучения для ранней диагностики болезни Альцгеймера с использованием МРТ и ПЭТ сканирования.

Научная значимость подтверждается:

- Активными публикациями в высокорейтинговых журналах Q1 (SJR 0.849-2.392)
- Значительным количеством цитирований (до 67 цитирований для статей 2023 года)
- Наличием исследований в ведущих международных базах данных (Google Scholar, ScienceDirect, Springer, Wiley)

Практическая ценность проявляется в

- Зарегистрированных патентах (2021-2024 гг.) на системы диагностики и прогнозирования
- Разработке конкретных методов и архитектур глубокого обучения для медицинской диагностики
- Активном участии научных организаций и коммерческих компаний в разработках

Перспективы развития направления очевидны из:

- Публикации свежих исследований (2025 год)
- Мультидисциплинарного подхода, сочетающего компьютерные науки, нейровизуализацию и клиническую медицину
- Постоянного совершенствования методов машинного обучения для повышения точности диагностики

Тема продолжает динамично развиваться и обладает значительным потенциалом для внедрения в клиническую практику, что может существенно улучшить раннюю диагностику и лечение нейродегенеративных заболеваний.