Artificial Intelligence in Spine Surgery

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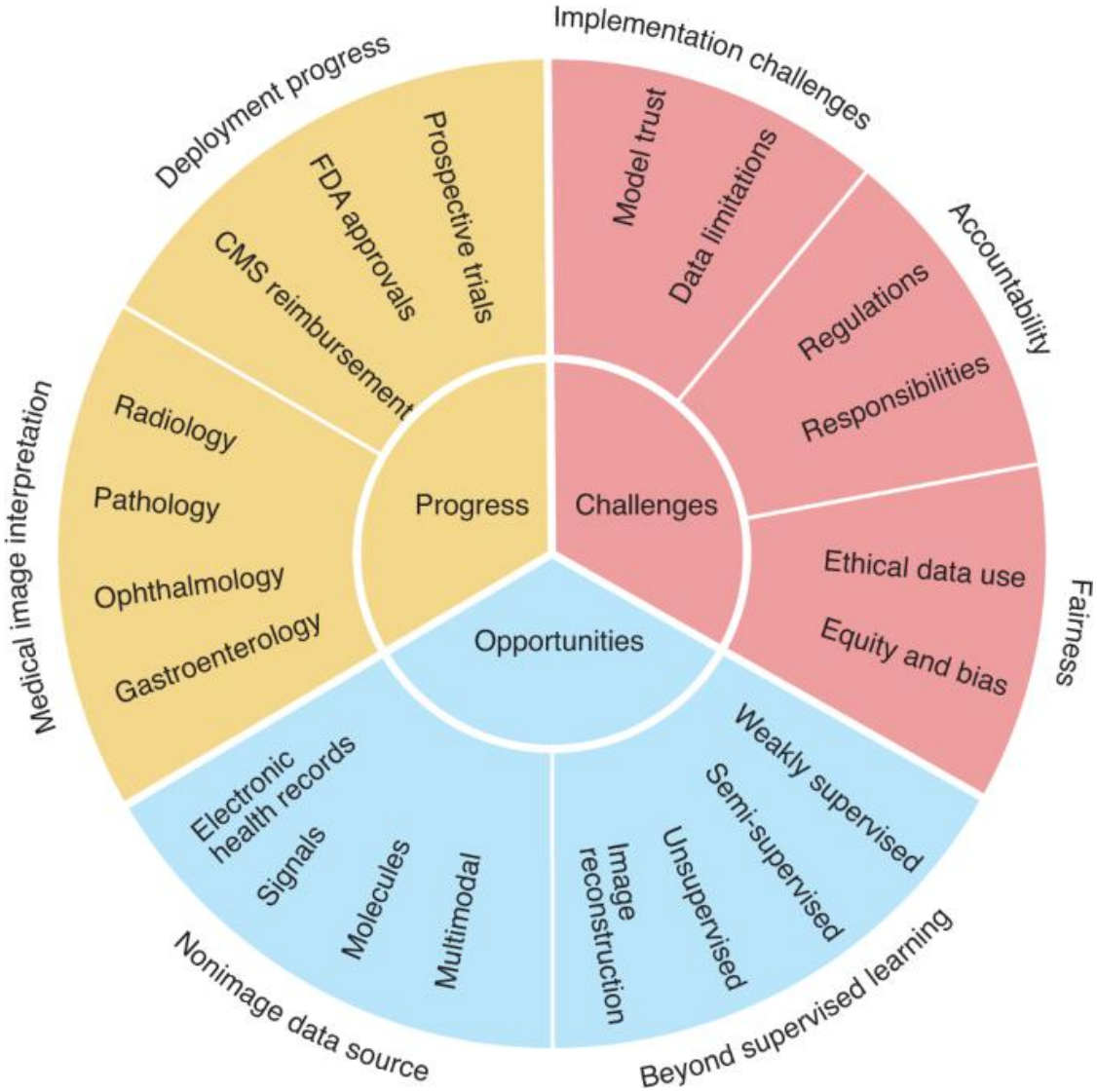
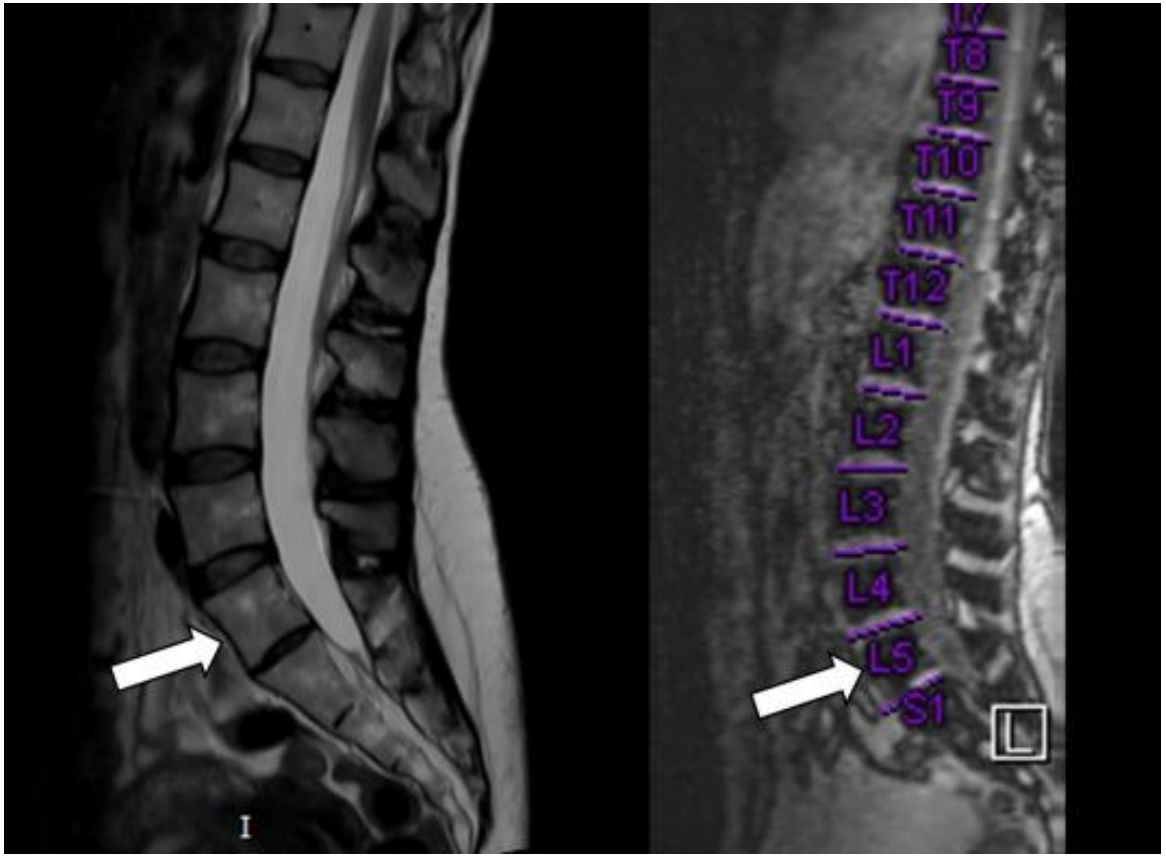
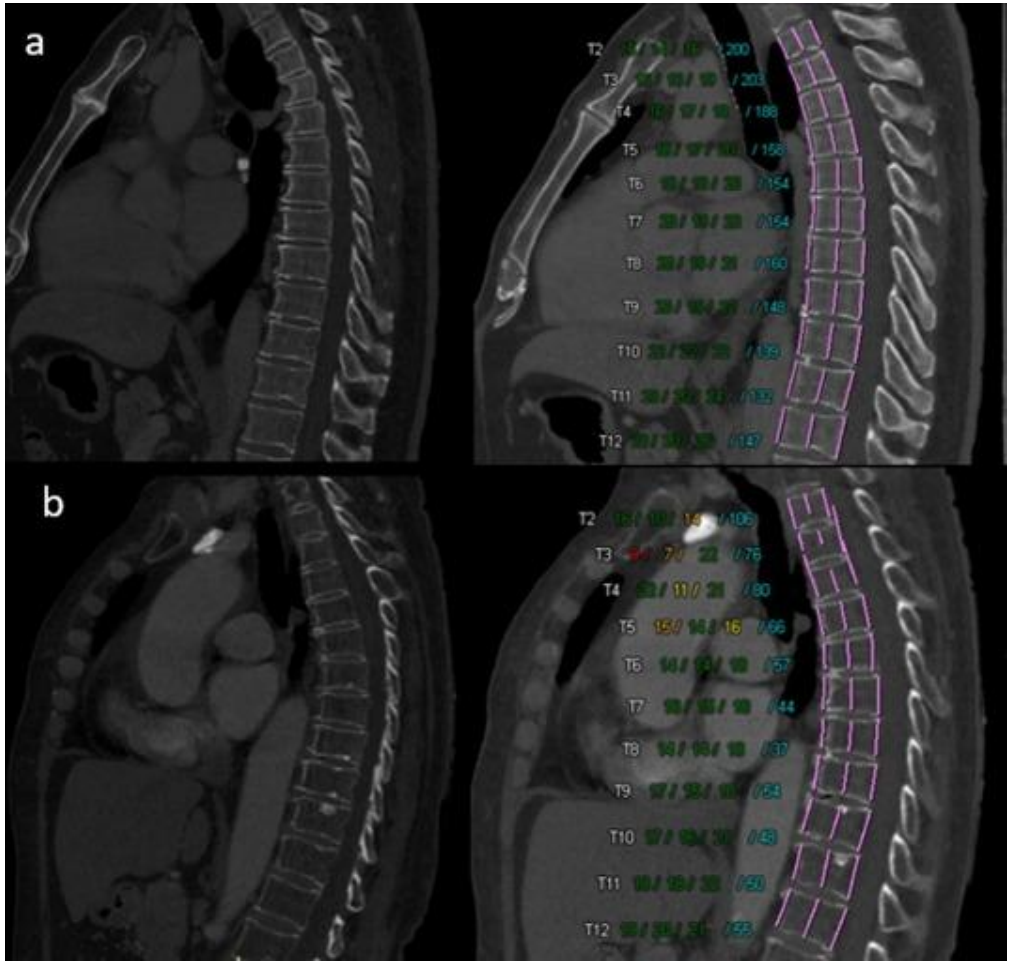
AI in Medicine



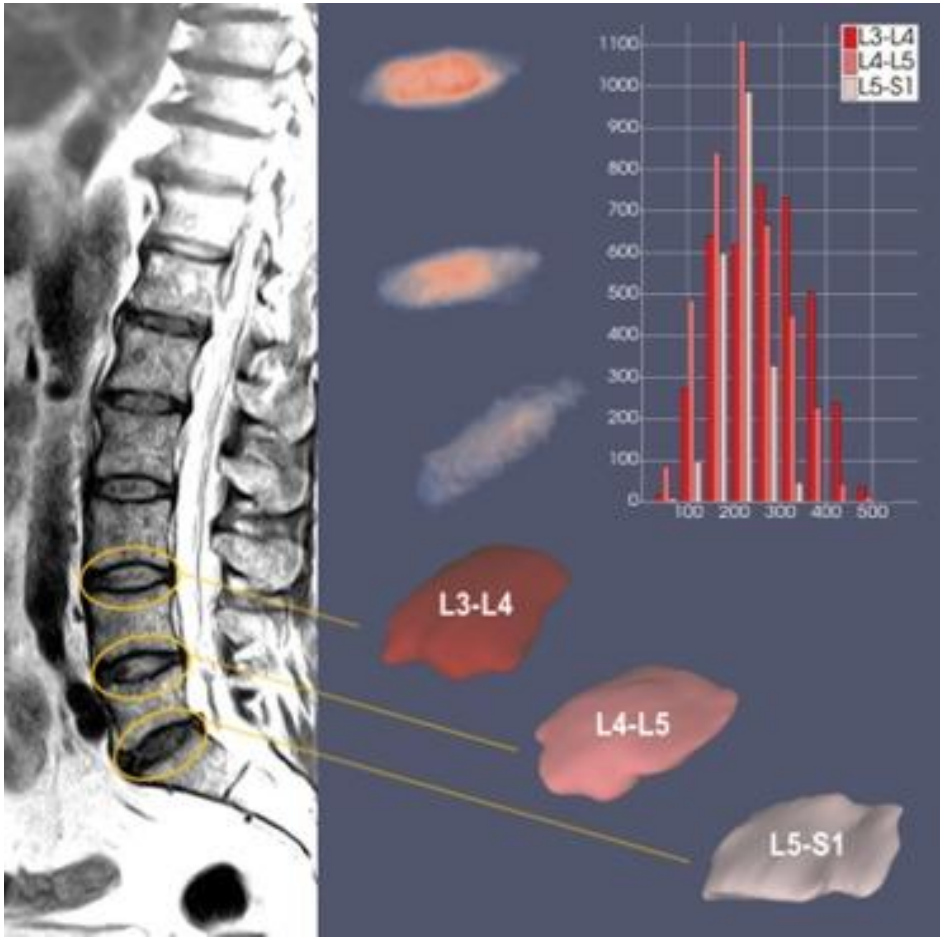
Artificial intelligence for Automatic Vertebral Numbering



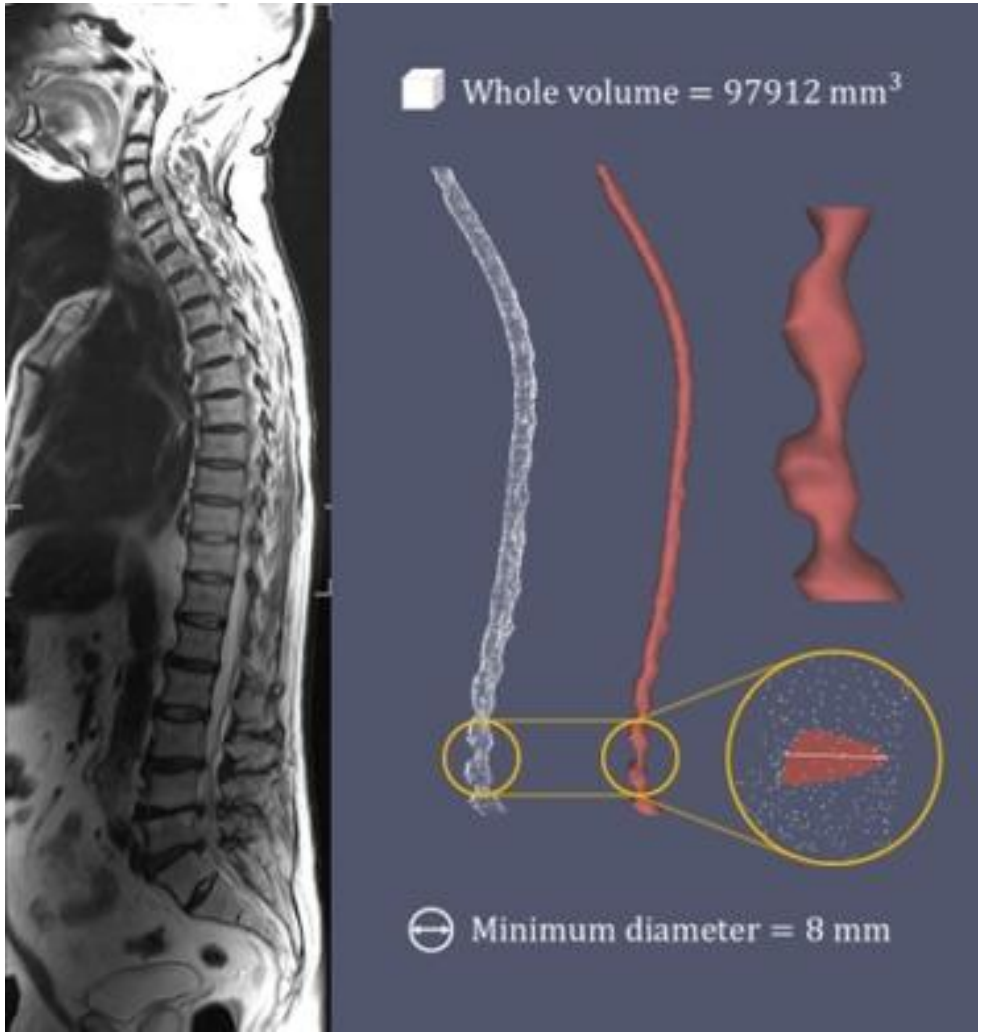
Artificial intelligence for automati assessment of bone mineral density



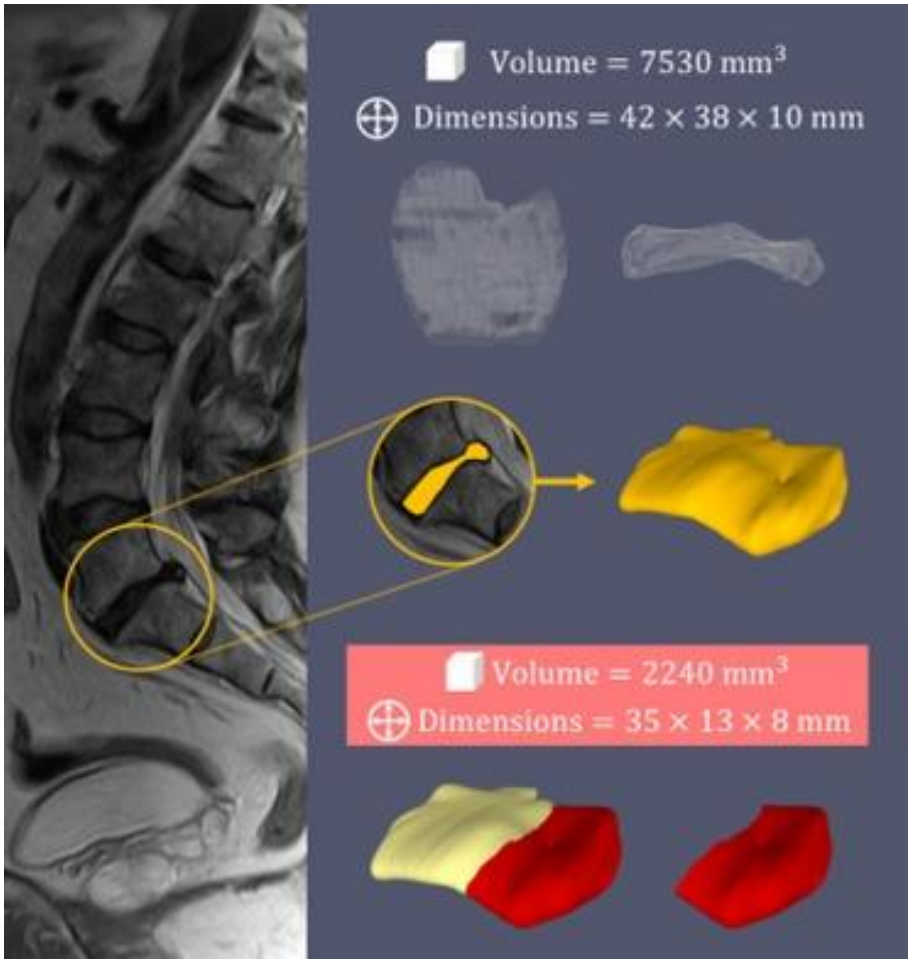
Intended result for automatic assessment of degenerative disc disease by means of artificial intelligence techniques



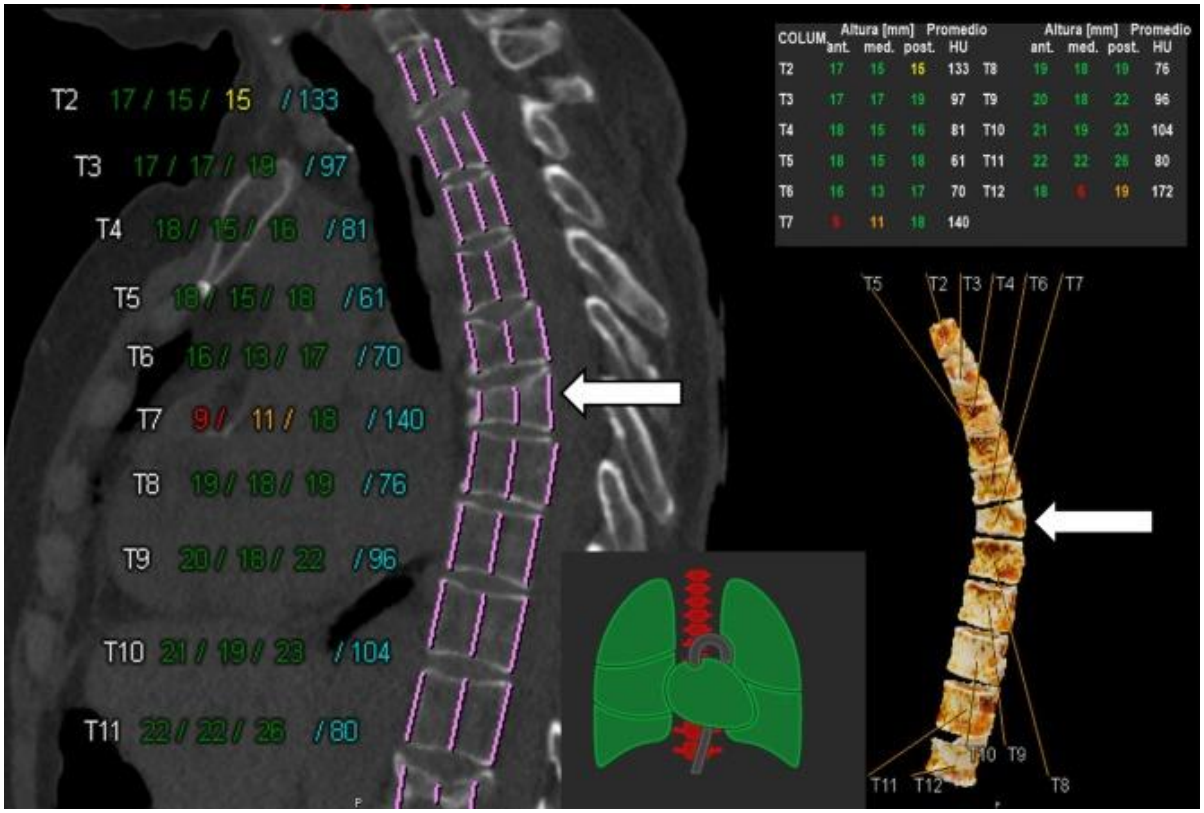
Intended result for automatic assessment of spinal canal stenosis by means of artificial intelligence techniques



Intended result for automatic assessment of disc herniation by means of artificial intelligence techniques.



Spine trauma: Artificial intelligence for automatic detection of vertebral fracture



Metastasis, hematologic disease, and spine infection

- a AI based system capable of identifying vertebral body sclerotic metastases on thoracolumbar CT, producing results in less than 2 min.
- Early ongoing work attempting to characterize metastatic spinal lesions.
- Radiomics can also be used to differentiate between metastatic and non-metastatic lesions in the vertebral marrow and to detect osteoporosis.

Artificial Intelligence in Spine Surgery, Neurosurgery Clinics, November 29, 2023

Summary of the main spinal cord AI applications

AI application	Ready for its clinical use	Impact on clinical practice	Imaging modality
Spinal cord segmentation	No	-Automatic segmentation of spinal cord -Radiotherapy planning -Spinal cord volume follow up -Multiple sclerosis assessment	MRI
Spinal cord trauma	No	-Correlation of automatic segmentation with disability -Advanced analysis of DTI data	MRI
Degenerative myelopathy	No	-Detect changes prior to conventional approach -Better clinical-radiological correlation	MRI

Artificial intelligence and spine: rise of the machines, The Spine Journal, June 16, 2021

Degenerative myelopathy

- Degenerative spondylosis is a pervasive problem that can lead to myelopathy in the setting of compressive effect on the cord. Before the onset of myelomalacia and permanent disability, however, early changes in cord structure occur.
- These changes often begin months or years before identifiable signal abnormalities on conventional MRI .
- Early diagnosis of these cord structural changes is performed using Artificial Intelligence.

Artificial intelligence used in medical procedure to help paralyzed man walk

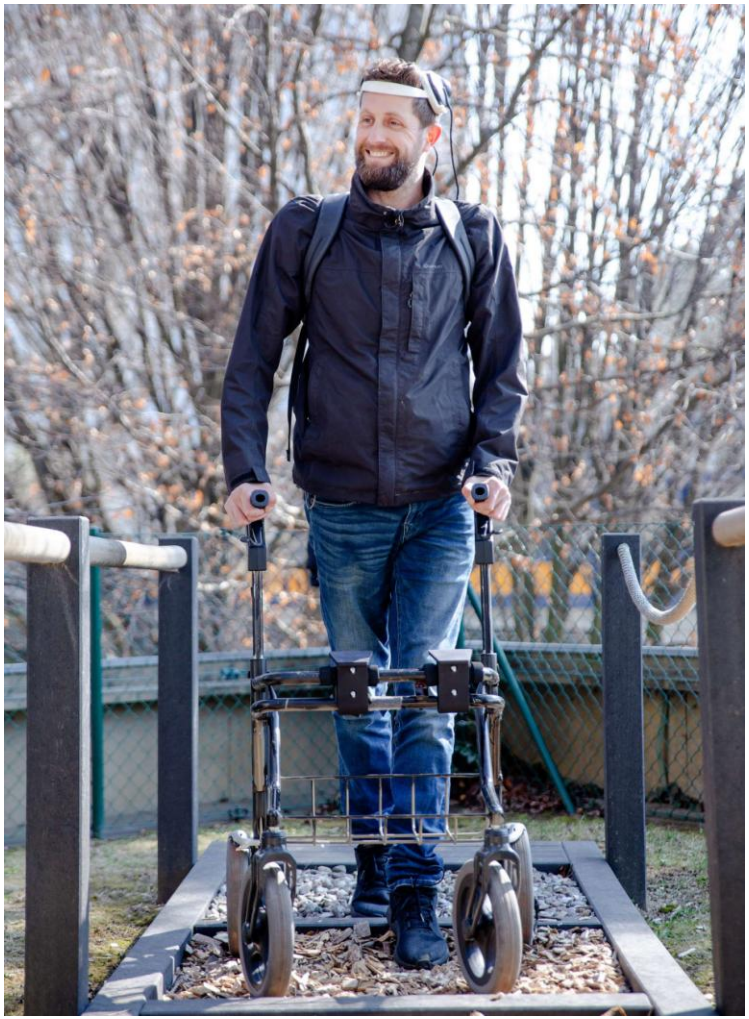
Oskam, 40, was able to walk after being paralyzed using a "wireless interface" between his brain and spinal cord using AI.

لینک مقاله

https://www.nature.com/articles/s41586-023-06094-5

لینک خبر

https://www.science.org/content/article/paralyzed-man-walks-naturally-thanks-wireless-bridge-brain-spine



Excelcius GPS equipment. A robotic arm-based technology along with multiple intuitive functions for working environment.