# Exploring the Role of Computed Tomography as a Neuroimaging Technique in the Diagnosis of Diseases

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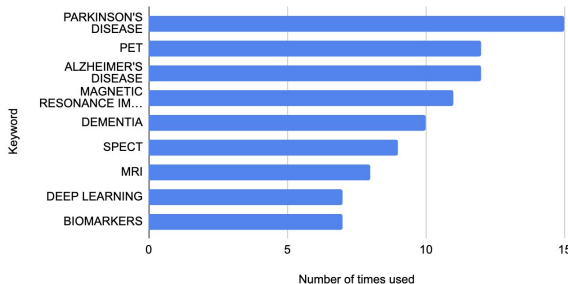
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## Introduction

Computed tomography (CT) is an imaging technique used by clinicians to detect abnormalities in the body. CT works by using rotating X-rays to construct 2D slices of a patient's body. These slices are stacked to create a 3D model of the scanned region. While CT scans are widely used because they're fast and accessible, they do have some drawbacks compared to MRI or PET scans. However, advancements in CT technology, like sharper image resolution and AI-assisted analysis, are improving its accuracy. As research continues, CT becomes an even more valuable tool for diagnosing diseases early and helping physicians plan treatments more effectively.
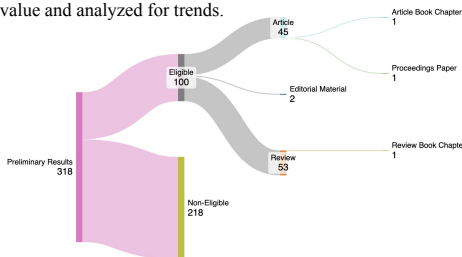
## Objectives

1. Evaluate the role of Computed Tomography as a neuroimaging technique
2. Review current literature to determine trends in recent research surrounding CT and its clinical impacts
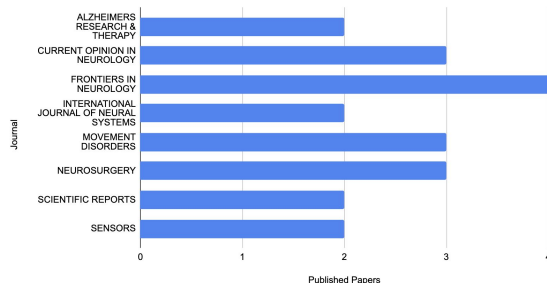
## Methods

We extracted our data from the Web of Science (Core Collection) database for Computed Tomography using the keywords "Neuroimaging," "Diagnosis," and "Disease." Our search yielded 318 papers which were narrowed down to the top 100 cited papers. These documents were exported into Biblioshiny and Excel. Relevant figures were generated using RStudio, Biblioshiny, and Google Sheets. A "Citation Value" for each paper was generated to assess the impact of each paper by ranking documents based on total citations and average citations per year since publication. The two ranks for each paper were averaged to generate a Citation Value. The papers were then reordered based on this value and analyzed for trends.





Most Frequently Used Keywords in the top 100 cited articles in Computed Tomography



Journals with multiple published papers among the top 100 cited articles in Computed Tomography over the last 10 years



## Results

Objective 1: According to Hostettler IC, Whitwell JL, and Saeed U, Computed Tomography is used for the diagnosis of conditions like Intracerebral Hemorrhages, PSP, and Parkinson's. CT has a wide range of applications and can be used to test for signs of illness like hypoperfusion or the presence of disease-related biomarkers.

Objective 2: Our analysis of the top 100 cited papers in Computed Tomography showed that recent research tended to focus on diseases such as Parkinson's, Alzheimer's, and Dementia. Research on CT also frequently involves other imaging techniques such as PET, MRI, and SPECT. Many of the most cited papers are published in Journals like Frontiers in Neurology, Current Opinion in Neurology, Neurosurgery, and Movement Disorders. Of the top 15 articles ranked based on the generated "Citation Value" scores, most papers were on Parkinson's Disease (n=6).

## Discussion

CT plays a key role in clinical settings by assisting physicians with the diagnosis of various diseases. We expect research surrounding imaging techniques such as Computed Tomography to continue growing in the near future. Among papers in our analysis, one of the most mentioned keywords is "Deep Learning"; we expect research in this field to grow as AI-assisted imaging and analysis becomes more influential in the field of medicine. Future research could continue to focus on different neurodegenerative diseases and movement disorders while implementing new methods to reduce the risks of scans and improve their accuracy.

## References

1. Web of Science Core Collection
2. Biblioshiny
3. RStudio
4. Computed Tomography - NIH