NeuroRad AI

Transforming Alzheimer's Diagnosis with AI.

THE PROBLEM

Accurate diagnosis of Alzheimer's disease faces obstacles due to **lengthy processes** and **substantial financial and accessibility barriers** associated with specialized PET scans, the established standard for neurodegeneration assessment.

THE SOLUTION

NeuroRad AI leverages an advanced AI model known as a **'Generative Adversarial Network'** to create PET images from MRI data, enhancing Alzheimer's diagnostics. Building on initial tests with 20 images, we're now **training our model on thousands of images** from the extensive Alzheimer's Disease Neuroimaging Initiative database and over 150 global institutions, promising improved accuracy and broader medical applicability.

TIMELY

Our technology ensures a swift Alzheimer's diagnosis, avoiding months of scheduling and processing a PET scan - making the whole diagnostic process up to **3x faster**.

AFFORDABLE

We reduce economic barriers to Alzheimer's diagnosis by capitalizing on MRI infrastructure, available at up to **1/10th of the cost** of a typically used diagnostic PET scan.

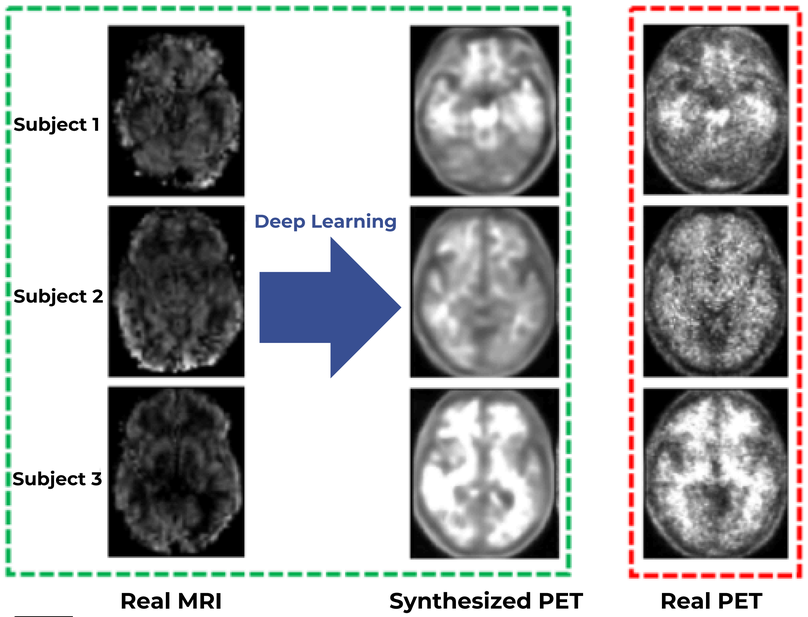
ACCESSIBLE

By utilizing widely available MRI technology and eliminating use of radiotracers, we make diagnosis accessible to **millions of patients** around the world.

OUR DATABASE

Working with such a large, diverse dataset ensures that our AI model is **robust and generalizable** when introduced to new patient data, further ensuring **accurate diagnosis across varied populations** around the world.

Banner Alzheimer's Institute · Albany Medical Center · Rush University Medical Center · Baylor St. Luke's Medical Center · Brown · Brigham and Women's Hospital (Founding Member, Mass General Brigham) · Columbia University · Boston Medical Center · Emory University · Duke University · Houston Methodist (Leading Medicine) · KU Hoglund Brain Imaging Center (The University of Kansas) · Georgetown University · Hôpital général juif Jewish General Hospital · Hudson Valley Imaging · Indiana University · Mayo Clinic · Keck Medicine of USC · Johns Hopkins Medicine · MUSC Medical University of South Carolina · Keller Center · Kennedy Krieger Institute · CNIR Center for Neuroscience Imaging Research · Akumin · Mount Sinai Hospital · The Ohio State University · Oregon Health & Science University · Rhode Island Hospital (Lifespan. Delivering health with care.) · Roger Williams Medical Center · UC Davis Health · robarts Research · South County Health · St. Joseph's Health Care London · Sunnybrook Health Sciences Centre · UDI · University Diagnostic Institute (Winter Park • Orlando • Lake Mary) · University of Kentucky · UCLA Health Radiology · KU Medical Center (The University of Kansas) · University of Maryland · University of Michigan · The University of Iowa · USC University of Southern California · UPMC Presbyterian · Wake Forest Baptist Health · YaleNewHaven Health Westerly Hospital · VA · U.S. Department of Veterans Affairs, VA Long Beach Healthcare System · Yale University · Washington University in St. Louis

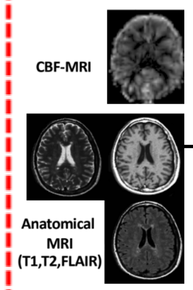


Scan for more data and statistics!

DATA PROCESSING

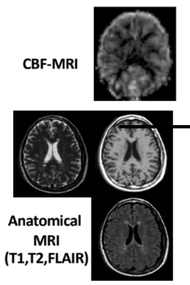
1. Collect & organize data from UW and ADNI
2. Transfer data from individual image files to workable, 3D filetype
3. Coregister (line up) all MRI and PET files to T1 scan (most anatomically accurate MRI scan)
4. Coregister T1 scan to standardized brain imaging space (MNI), calculate transfer function
5. Apply transfer function to the T1-coregistered MRI and PET images
6. Use this processed dataset to train the deep learning model!

Model Training



Patch Extraction → Deep Convolutional Neural Network → Model output / Ground-truth

Synthesis



Trained Deep Convolutional Neural Network → Synthesized

IMPACT

Our approach is set to transform Alzheimer's diagnostics by significantly improving the accessibility of advanced imaging, enabling critical early detection that can change the course of the disease. **By facilitating early interventions, our technology will prolong precious time spent with family.** Our goal is to enhance access to early detection of Alzheimer's, making things easier for those already battling with a devastating disease.

- Mentors and Advisors -

Dr. Hesam Jahanian: Assistant Professor of Radiology, Project Advisor, recognized by the International Society of Magnetic Resonance in Medicine
Peter Beidler: Senior Medical Student, Machine Learning Engineer, Mentor
Dr. Rupak Rajachar: Master of Applied Bioengineering Program Director, Advisor

- Project Team -

Hannah Arey: Master of Applied Bioengineering Student, Engineer. Background in Alzheimer's research and experience in the AI industry.
Yoon Seo Orite: Master of Applied Bioengineering Student, Engineer. Background in signals processing and medical imaging modalities.