The Development of a Program Capable of the Detection of Mild Cognitive Impairment and Alzheimer's Disease using PET Scans

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The purpose of this experiment is to develop a method to accurately detect mild cognitive impairment (MCI) and Alzheimer’s disease using positron electron tomography (PET) scans. Goal 1 is to determine ROIs (regions of interest) of a PET scan significant in detecting MCI and Alzheimer’s. Goal 2 is to create software to diagnose normal conditions using ROI data with 96% accuracy or more. Goal 3 is to create software to diagnose MCI using ROI data with 94% accuracy or more. Goal 4 is to create software to diagnose Alzheimer’s using ROI data with 94% accuracy or more. The purpose is accomplished by analyzing glucose counts within ROIs, being the left angular gyrus, right angular gyrus, bilateral posterior cingulate gyrus, left inferior temporal gyrus, and right inferior temporal gyrus, of scans (from ADNI and the ADNI funding sources) with known diagnoses of normal, MCI, and Alzheimer’s, throughout an analysis of variance (ANOVA). ROIs found significant in detecting MCI and/or Alzheimer’s are used in a Python program. This program compares the glucose count to the ANOVA data, and attempts to give an accurate diagnosis. The overall accuracy of the diagnoses is calculated, and success is determined according to the goals. Goal 1 was met, as ROIs significant in detecting MCI and Alzheimer’s were determined; all ROIs were significant. As the normal diagnoses were 78.7% accurate, Goal 2 wasn’t met. As the MCI diagnoses were 58.7% accurate, Goal 3 wasn’t met. As the Alzheimer’s diagnoses were 90.7% accurate, Goal 4 wasn’t met.

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