Review of: "An Improved Hybrid Transfer Learning-Based Deep Learning Model for Alzheimer's Disease Detection Using CT and MRI Scans"

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Authors applied a DL

Despite the problem tackled is relevant from a clinical perspectives several limitations can be recognized:

1. Authors presented their work as *"… Hybrid Transfer Learning-Based … Using CT and MRI Scans,"* but in the section describing the experimental setup (4. Proposed Work and Experimental Evaluation) they only mentioned about the usage of MRI scans (CT scans seem not being included at all in the work)

2. There are other works in literature where the authhours compared the results obtained from different pre-trained CNN for the staging of AD from MRI images. The novelty introduced from the present work should be better outlined

   1. (e.g., without preting to be exhaustive from the surveyhttps://doi.org/10.1016/j.artmed.2022.102332, see the work https://doi.org/10.1109/ICACC48162.2019.8986170)

3. The description of the experimental setup does not allow reproducibility of the work, e.g.:

   1. Data pre-processing:

      1. ADNI dataset provides volumetric sMRI (). Such authors applied 2D CNN, what are the preprocessing step applied to perform the selection of the slices?

      2. Have additional transformations been applied to the images in addition to the image resize/slice selection (e.g. Registration to standard space, skull stripping)?

   2. Data selection:

      1. As authors employed a public dataset, it should be useful for reproducibility purposes providing the list of exam ID in training/validation/test set

      2. As ADNI is a longitudinal study, MRI dataset contains multiple exams of the same subjects. Did the authors perform the splitting into training/validation/test at subjects' level? Otherwise different exams of the same subject could be present in different set and the final classification performances obtained would be unfairly overestimated (data-leakage)

3. Training procedure: Training's hyperparameters not completely reported (e.g. Batch Size)