



Canadian Association  
of Physicists

Association canadienne  
des physiciens et physiciennes

Contribution ID: 4287

Type: **Poster not-in-competition (Undergraduate Student) / Affiche non-compétitive (Étudiant(e) du 1er cycle)**

## **(UG) (POS-30) Multi-Modal Neuroimaging based Mutual Information Decomposition for Alzheimer's Disease Diagnosis**

*Tuesday, May 28, 2024 6:23 PM (2 minutes)*

Precise diagnosis of Alzheimer's disease (AD) is crucial to ensure timely intervention and evaluate patient prognosis. Although integrating multi-modal neuroimaging such as MRI and PET has the potential, there are still challenges in effectively integrating multi-modal images. To this end, we propose a deep learning-based framework that uses Mutual Information Decomposition to obtain modality-specific information and combines attention mechanisms to learn the optimal multi-modal feature combinations. Our proposed framework includes three parts. First, we design a feature extractor for modality-specific information through mutual information separation. Second, we optimize the combination of modality-specific features by adding attention constraints. Third, we mitigate the over-fitting of the model through multi-task learning to improve the generalization ability. Evaluation results on the ADNI dataset highlight the effectiveness of our method. Our work demonstrates the potential of effectively integrating multi-modal neuroimaging data for advancing early AD detection and treatment.

### **Keyword-1**

Multi-Modal Neuroimaging

### **Keyword-2**

Information Decomposition

### **Keyword-3**

Alzheimer's Disease Diagnosis

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**Session Classification:** DPMB Poster Session & Student Poster Competition (28) | Session d'affiches DPMB et concours d'affiches étudiantes (28)

**Track Classification:** Technical Sessions / Sessions techniques: Physics in Medicine and Biology / Physique en médecine et en biologie (DPMB-DPMB)