虚拟现实技术与系统全国重点实验室
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Integrating Transient and Long-term Physical States for Depression Intelligent Diagnosis

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Introduction

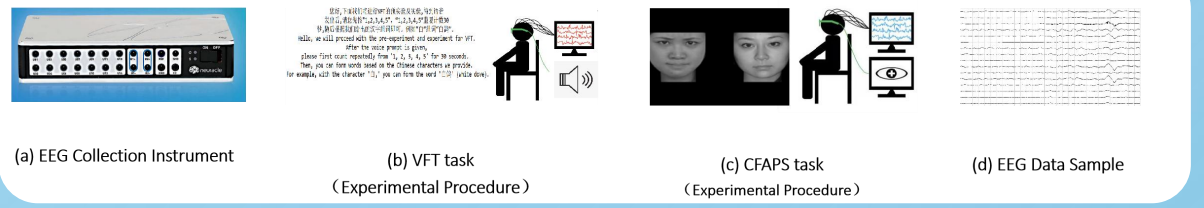
KeyWords:
EEG,Tongue,MultiModal TraditionalChineseMedicine

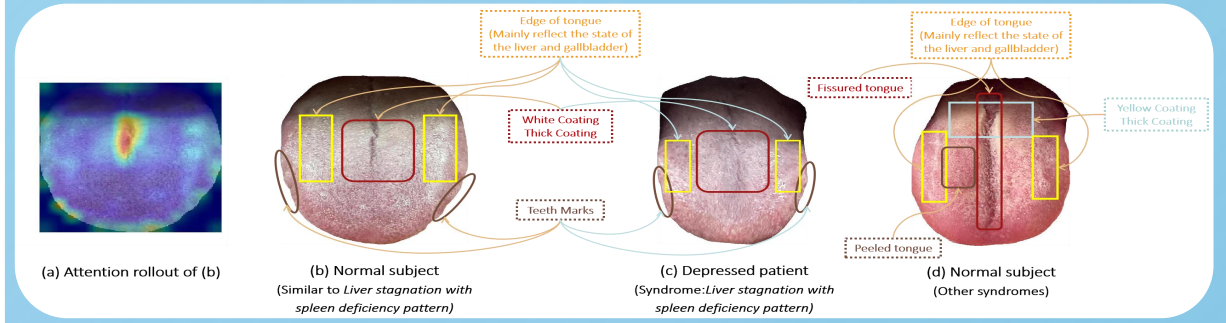
Motivitaitons:

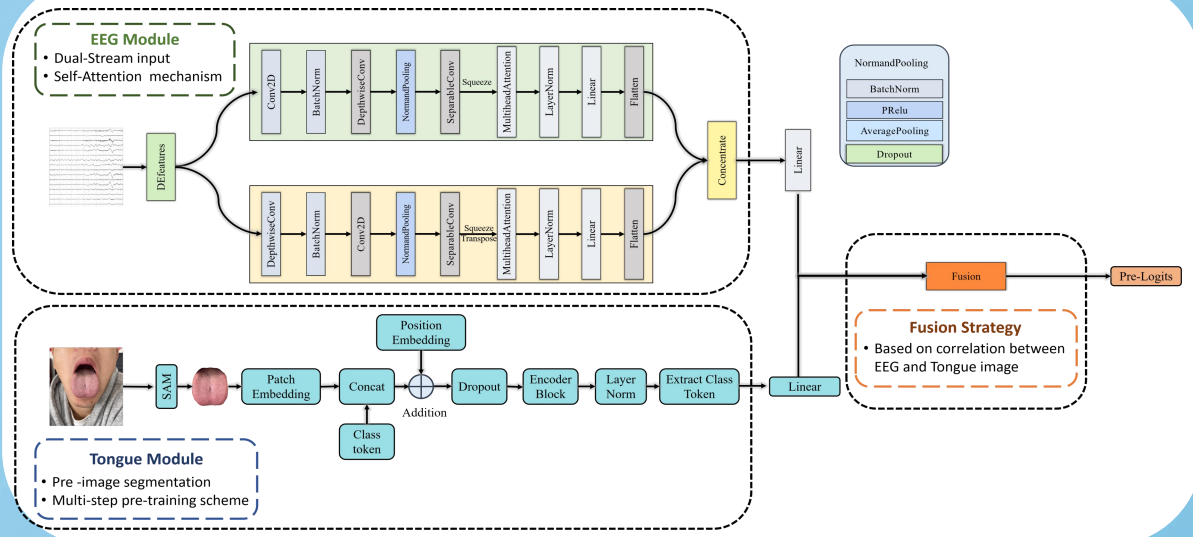
- ***1. Traditional Depression Diagnosis: Subjective and Scale-Based Approaches***
- ***2. Unimodal EEG Diagnosis: Lacks Long-term Analysis***
- ***3. TCM Tongue Observation: Awaiting Intelligent Diagnostic Methods***

Contributions

- ***1. Comprehensive Multimodal Diagnosis Using EEG and Tongue Images***
- ***2. New Architecture for EEG Spatio-temporal feature extraction***
- ***3.New Methoods for TCM Intelligent Diagnosis Based on Tongue Images***







Results

EEG: SOTA on MODMA
Tongue: First Depression-related Work
Fusion: Correlation Validation and Acc Improvement

Table 4: Comparision on MODMA

Model	MODMA Acc
Trans_EEGNet	**99.05% ± 1.26%**
MPA[27]	92.73%(LOSO)
mKTAChSel[30]	89.97%(LOSO)
GRL[31]	88.88%(10fold)
CNN-GRU-ATTN[41]	99.33%(9:1split)
TPTLP[34]	83.96%(LOSO)100%(10fold)
SparNet[6]	94.37%(LOSO)

Table 6: Results of Multi-modal Module

Fusion Method	Private Acc
Parallel Channel	92.72% ± 6.16%
DCCA	85.45% ± 1.81%
Concat	**98.18% ± 3.63%**
Bilinear Pooling	97.27% ± 3.63%

An overview of MMTV which consists of three modules:
1)EEG module with Trans_EEGNet featuring the dual-stream input and self-attention mechanism. 2)Tongue module with multi-step pre-training method(loading pretrained weight on ImageNet,training Siamese net as meta-learning,training with unpaired tongue images) 3)Fusion module with best result selected from results of methods such as concat, DCCA et.al.