Ziqiao Weng

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RESEARCH INTERESTS

Machine Learning, Computer Vision, Medical Imaging, Neuroscience.

EDUCATION BACKGROUND

Zhejiang University City College, Hangzhou, P.R.China
Bachelor of Engineering in Electronics and Information Engineering Sept. 2015 – Jun. 2019
GPA: 3.89/4 (Major: 3.96/4) Ranking: 1/113

PUBLICATIONS

- **Ziqiao Weng**, Jingjing Meng, Zhaohua Ding and Junsong Yuan. S3F: A Multi-view Slow-Fast Network for Alzheimer's disease Diagnosis. Accepted by *IEEE International Conference on Multimedia & Expo (ICME 2020)*.
- **Ziqiao Weng.** From conventional Machine Learning to AutoML. Accepted by *International Conference on Control Engineering and Artificial Intelligence (CCEAI 2019)*.

RESEARCH EXPERIENCES

X-ray Scatter Correction using Deep Learning Nov. 2020 – Now

The Chinese Academy of Sciences

Advisor: Prof. S.Kevin Zhou

- Exploring deep learning base method for scatter reduction in CT image .

Spatio-Temporal Deep Learning for Medical Image Diagnosis Mar. 2020 – Now

Advisor: Prof. Junsong Yuan & Prof. Jingjing Meng

Primary Framework: Pytorch, Matlab

- Embedded convGRU to our S3F network to learn temporal information of spatio-temporal rs-fMRI data by treating 3D volumes of continuous time points as a time series.
- The convGRU-S3F network reaches 84.71% accuracy, 4% higher than that of the S3F network, on EMCI classification task using fMRI data.
- Examined GRU-S3F network on the Autism Brain Imaging Data Exchange I (ABIDE I) dataset, which contains preprocessed resting-state 4D fMRI sequences of patients with ASD and healthy controls.

Multi-view Slow-Fast Learning for Alzheimer's Disease Diagnosis Jul. 2019 – Dec. 2019

Visual Computing Lab, CSE Department, University at Buffalo

Advisor: Prof. Junsong Yuan & Prof. Jingjing Meng
Primary Framework: Pytorch, Matlab

- Collected the structural Magnetic Resonance Imaging (MRI) and resting-state functional MRI (rs-fMRI) data from the publicly accessible Alzheimer's Disease Neuroimaging Initiative (ADNI) database.
- Normalized MRI and fMRI data using Data Processing Assistant for Resting-State fMRI (DPARSF) toolbox and made grey matter and white matter masks to segment fMRI data.
- Proposed a multi-view framework (based on SlowFast) that can simultaneously operates rs-fMRI data as video from three perspectives, corresponding to three anatomical planes of human body, through two kind of pathways with different spatial and temporal capacity. Our model achieves state-of-the-art accuracy on Early Mild Cognitive Impairment (EMCI) classification task.
- Proposed the S3F network, which further improved the multi-view framework by integrating SE-Layer into backbone network and introducing more multi-view interactions, showing higher accuracy on EMCI classification task with lower parameters and GPU memories required.

- Improved the S3F network for the classification task over all clinical phases of Alzheimer's Disease, including six classes, by embedding the GHMC loss into the cross-entropy loss to address the imbalance problem of data distribution. Besides, the baseline benchmark provided by further experiments proved the superiority of the S3F over previous multi-view framework and SlowFast network.

Meta-Learning on Physics-Informed Neural Networks

School of Computing, University of Utah Oct. 2018 – Jan. 2019

Advisor: Prof. Shandian Zhe

Primary Framework: Tensorflow

- Applied four hyperparameter optimization algorithms, including bayesian optimization, genetic algorithm, hyperband and random search to learn the optimal fully connected structure of Physics-Informed Neural Networks (PINN), a data-driven solution of nonlinear Partial Differential Equations (PDE).
- Examined the meta-learning based PINN on the solution of Burgers and Poisson PDE, where the best result (error rate) of Burgers is 3.3e-4 and that of Poisson is 0.7e-4.
- Analyzed the data sampling error of PINN for Burgers and Poisson PDE.
- Explored the approximation power of the improved PINN on different physical functions, including Bessel and Branin functions.

Machine Learning on Mining Multifactor Models

IIIS, Tsinghua University Jun. – Oct. 2018

Advisor: Prof. Jian Li

Primary Framework: Pytorch

- Examined the IC (Information coefficient), i.e., the ability of a factor to predict stock returns, of 152 multifactor models using the data of existing 3500+ stocks and selected 33 factors with high performance where IC>0.1.
- Proposed an MFC (Mutable Fully Connected) Network to learn explicable multifactor models (e.g. *Alpha model*) by replacing the activation function of each hidden unit with a factor function, automatically selected from a set factor functions based on the corresponding output of the hidden unit.
- Used two kinds of boosting algorithm, XGboost and LightGBM, to buld the multi-factor model based on decision tree respectively and to analyze the importance of 104 factors on the market, where the model showed strong IC significance.

SERVICES

Invited Reviewer for IEEE Access

AWARDS

Excellent graduation thesis, ZUCC	2019
Provincial Government Scholarship, Zhejiang Provincial Government	2018
First-class Scholarship in Academic Excellence, ZUCC (TOP 3%)	2017 - 2018
First-class Scholarship in Academic Excellence, ZUCC (TOP 3%)	2016 - 2017
First-class Scholarship in Academic Excellence, ZUCC (TOP 3%)	2015 - 2016
Scholarship in Student Exchange Program, ZUCC	2016