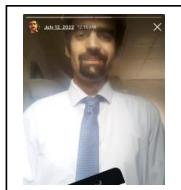


# Curriculum Vitae

## PERSONAL INFORMATION



### Mojtaba Moattari

- Canada, Ontario, Kingston, 151<sup>st</sup> Pine St., Postal Code K7K1W9.  
 +1 (862)946-2999  
 mojtaba.moattari@queensu.ca  
 <https://moatary.github.io>  
 [live:.cid.9628a3c5b13a49e8](skype:cid.9628a3c5b13a49e8) (Skype ID)

Sex Male | Date of birth 19/09/1991 | Nationality Iranian

## WORK EXPERIENCE

2018 - 2022

### Software developing and Machine Learning research

Medical research and development center - Shiraz

Queen's university- Kingston- Ontario

**Internship -- Pfizer Canada, Project:** "Prevalence of Moderate-to-Severe Osteoarthritis Pain"

**Internship -- Mediior Health Outcomes Ltd, Project:** "Diagnosis of Early Alzheimer's Disease"

- Medical Data Analysis, Deep learning, Computer Vision, Interface design
- Passed Data Analytics (CISC 451/839, Score level: A), Data Mining (CISC 873, Score level: A), Reinforcement Learning (CISC 856, Score level: A), Deep Learning (CISC 867, Score level: A)

2015 - 2017

### Cognitive Trace Data Analysis, Machine Learning

Amirkabir University of Technology, Signal Analysis Lab.

- Natural Language Processing of scholarly data, Bio-Signal Processing, Paradigm Study, Statistical / Supervised Model Inference

2011 - 2013

### Projects Management

Shiraz university Radio-Amatory, Machine Vision Lab.

- Image Analysis Projects, Object Detection, Ultrasonic, touching calculator, anti-theft device, Visualization, Car Plaque Detection, Text2speech

## EDUCATION

2009 – 2013

### B.Sc. in Electrical Engineering

Shiraz University, Shiraz, Iran

- 1274th out of 200K participants in nation-wide exam
- Thesis Score: 3.80 / 4.00

▪ Thesis ([In a glance \(click here\)](#)): Persian text to speech converter. **Supervisor:** Prof. R. Sameni (Full Professor)

- Machine Vision (A), Biological Signal Processing (A), Statistical Pattern Recognition (A), Programming Basic (A)

2014 – 2016

### M.Sc. in Bioelectrical Engineering

- Polytechnic University, Tehran, Iran. 299<sup>th</sup> out of 8709 participants in nation-wide exam. Score: 4.00

▪ **Supervisor:** Prof. M.H. Moradi (Full Professor)

- Thesis ([In a glance \(click here\)](#)): EEG classification improvement in speech imagery BCI using dictionary learning.

[t](#)

M.Sc. Project

[t](#)

2020 – 2024

### Graduate Research Assistant in Computer Science

- Queen's University, Kingston, Ontario, Canada

▪ Big-Data Analytics and Management Laboratory (BAM Lab), **Supervisor:** Prof. F. Zulkernine

- Head of Medical Data Analytics Group

▪ Thesis ([In a glance \(click here\)](#)): An Accurate and Interpretable cognitive-inspired method for multimodal behavior analysis. My Recent Master Thesis (PDF) : [Link to Download](#)

## PERSONAL SKILLS

### Language

English  
(Dec 2019 TOEFL score : 99/120)

	LISTENING	READING	SPOKEN INTERACTION	SPOKEN PRODUCTION	
	28 / 30 (TOEFL)	26 / 30 (TOEFL)	27 / 30	20 / 30 (TOEFL)	25 / 30 (TOEFL)

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## PUBLICATIONS

**Published, Preprint**

**A Study on Variants of Conventional, Fuzzy, and Nullspace-Based Independence Criteria for Improving Supervised and Unsupervised Learning, 2025**

[Link to Download PDF](#)

**Multimodal Ensemble Classifiers: Design, Performance, and Interpretability, 2024**

[Link to Download PDF](#)

**An Attentive Method for Multimodal Language Analysis and Interpretation, 2023**

[Link to Download PDF](#)

**Moattari, M., Fuzzy, Attentional, and Distributed Hybrid Fusion Guaranties Models Accuracy and Certainty, 2023**

[Link to Download PDF](#)

**Chen, Y., Shu, B., Moattari, M., Zulkernine, F., Queenan, J., & Barber, D. (2023, July). SPaDe: a synonym-based pain-level detection tool for osteoarthritis. In 2023 IEEE International Conference on Digital Health (ICDH) (pp. 118-120). IEEE.**

[Link to Download PDF](#)

**ProjB: An Improved Bilinear Biased ProjE model for Knowledge Graph Completion**

- Increasing interaction of relation-entity feature by proposing a bilinear variation of ProjE Knowledge-Graph Embedding. [Link to Download PDF](#)

**Fu, Z., Gu, X., Fu, J., Moattari, M., & Zulkernine, F. (2021, December). Predicting the Length of Stay of Patients in Hospitals. In 2021 IEEE International Conference on Bioinformatics and Biomedicine (BIBM) (pp. 3150-3156). IEEE.**

- Using four types of neural networks to predict length of stay with Microsoft Length-Of-Stay 2017 dataset. [Link to Download PDF](#)

**Hogan, I., Qiao, D., Luo, R., Moattari, M., Carthy, A., Zulkernine, F., ... & Breton, M. (2021, December). FireWarn: Fire Hazards Detection Using Deep Learning Models. In 2021 IEEE Third International Conference on Cognitive Machine Intelligence (CogMI) (pp. 1-10). IEEE.**

- Investigating State-Of-The-Art ConvNets on identification and classification of fire-hazard. [Link to Download PDF](#)
- Best paper award, CogMI conference

**When Metaheuristics Meet Reinforcement Learning: a Comparative Cognitive-inspired Approach.** Optimization of Policy in Reinforcement Learning with Cognitive-inspired Meta-heuristics

- Reinforces Reinforcement Learning with cognitive-inspired algorithms like Actor-Observer effect, Avoidance Learning, and Hierarchical Processing.

[Link to Download PDF](#)

**Moattari, M., Moradi, M., 2020. Conflict Monitoring Optimization Heuristic Inspired by Brain Fear and Conflict Systems. International Journal of Artificial Intelligence, 7(A11), pp.125.**

- New meta-heuristic inspired by cognitive and neuroscientific aspects of Brain. [Link to Download PDF](#)

**Precise classification of low quality G-banded Chromosome Images by reliability metrics and data pruning classifier**

- Improves the classification Precision of data using new reliability thresholding metrics, pruning classifier and deliberately engineered features. [Link to Download PDF](#)

**Roshandel, E., & Moattari, M. (2020). Genetic-TLBO Algorithm for Power System Stabilizer. Current Signal Transduction Therapy, 15(3), 270-283.**

- Combining Genetic Algorithm (GA) with Teaching-Learning-Based-Optimization for fine-tuning a system stabilizer and improving the intensification power of Genetic Algorithm. [Download PDF](#)

**Moattari, Mojtaba, et al. Independent Component Analysis Approach Using Higher Orders of Non-Gaussianity. Electrical Engineering (ICEE), 2017 23rd Iranian Conference on. IEEE, 2017.**

- Reformulating Independent Component Analysis (ICA) in a more powerful data-driven way suited for nonlinearities and dynamicity of brain trace data. [Link to Download PDF](#)

Roshandel, Emad, and Mojtaba Moattari. "Novel line search based parameter optimization of multi-machine power system stabilizer enhanced by teaching learning based optimization." *Electrical Engineering (ICEE), 2015 23rd Iranian Conference on. IEEE, 2015.* [Link to PDF](#)  
Improving Teaching-Learning-Based-Optimization by a line-search method to tune a control system

Moattari, Mojtaba, et al. "Novel Optimization Metaheuristic Model Inspired by Fear and Conflict System in Brain." *Biomedical Engineering (ICBME), 22th Iranian Conference, 2015.*

- Conflict Resolution System in ACC cooperates with Fear System in Amygdala to list, reevaluate and reorder suitable programs for survival. Ideated on this, I proposed a meta-heuristic that optimizes an objective function using series of clues measuring danger (i.e. closeness to plateau, reduction in fitness raise,...). [Link to download PDF \(Persian language/ Not in English\)](#)

Moattari, M., Moradi, M. H., & Roshandel, E. (2020). Uncertainty Principle based optimization; new metaheuristics framework. *arXiv preprint arXiv:2006.09981.*

- Adaptive exploration and exploitation using a new uncertainty metric. [Link to Download PDF](#)

Moattari, M., Moradi, M. H., & Boostani, R. (2019). Modified swarm-based metaheuristics enhance Gradient Descent initialization performance: Application for EEG spatial filtering. *arXiv preprint arXiv:1907.08220.*

- Introducing organization and hierarchical structures to PSO and ICA, two swarm-metaheuristics. This algorithm improved Gradient Descent in a subspace learning optimization, led to higher classification accuracy. Available on Arxiv. [Link to Download PDF](#)

Moattari, M., Roshandel, E., Kamyab, S., & Azimifar, Z. (2019). A New Approach for Optimizing Highly Nonlinear Problems Based on the Observer Effect Concept. *arXiv preprint arXiv:1906.05516.*

- A Gradient Descent Initializer, inspired by a cognitive effect called Observer-Actor-Bias. Implementation on EEG classification task shows that spatial filter performance is improved in capturing stationarity between EEG sessions. Available on Arxiv. [Link to Download PDF](#).

## Under Preparation

### XFuse: A survey of explainable methods for multimodal fusion

- Current interpretable approaches (LIME, SHAP, GramCAM,...) are not useful in interpreting multimodal fusion models. A survey of interpretable/explainable methods is provided, and the guidelines to make them multimodal are added to each section.

### Bi-query-MuLT: accurate model for aligned multimodal affective computing

- Introducing a new efficient multimodal transformer to seek unseen cross-modal interactions beyond the usual 2-modal relationships conventional in current transformers. Improving state of the art results on multimodal benchmarks.

### Prevalence of moderate-to-severe Osteoarthritis pain of the hip and knee by Index Joints in Canadian Primary Care: A proof of concept study from the Canadian Primary Care Sentinel Surveillance Network

- Identify pain level from medical chart note under unstructured text data. Implemented an NLP model to annotated text data automatically. [Link to Poster](#)

### Development of a Novel AI System for Breast Cancer Detection on Screening Mammograms

- Our work proposes a model based on Faster RCNN to detect lesions associated with breast cancer from a large, diverse dataset of mammograms. [Link to Poster](#)

### Deeper Learning of Deep Learning by experimenting on activations, learning rates and regularizations

- Our work uses unconventional settings for designing deep learning models (wrong regularization, activation, highly nonlinear losses, non-Lipschitz-continuous functions, non-universal approximators...) to teach researchers more about nature of deep learning, the challenges, and insightful vision. [Link to Summary](#)

### New Independent Component Analysis method and application to image denoising and word2vec

- Bringing about perfect independency without enforcing distribution assumptions, it improved accuracy of word-analogy task compared to LSA and GLoVe. This type of ICA is consistent with the idea of. It also outperformed SOTA ICA method in image decomposition.

### Capturing shared space of multiple orders of Co-occurrences in Knowledge-Graph-

**Embedding: a variant of Maximum Dependency Minimum Redundancy**

- Conducting Maximum Dependency Minimum Redundancy using ensembles of [NICE](#) models, which is an autoencoder-based ICA.

**Info-theoretically Optimal Discrimination in Tree of Metrics of Large-Margin-Nearest-Neighbor**

- Per each edge of Decision Tree, it discriminates labels in two groups that not only dissects with highest information gain, but also familiarizes best labels with best features in decreasing degree of importance using a modified LMNN loss.

**An ergonomic human-in-the-loop translation memory system equipped with Neural and Statistical Machine Translation**

- I designed a translation memory system that pushes its own boundaries by learning from its mistakes, and feeding new user corrections back to the model trainer modules to improve its performance through time. The system optimizes the total number of required key-press for translating the words by inspiring from Huffman codes and Shannon-Hartley theorem.

**PROJECTS AND RESEARCHES**

2010-2013

**Project and Development**, Shiraz University, Shiraz, Iran

- Age Progression of faces using Family similarities for Machine Vision Course
- Persian Text to speech using concatenative approach in MATLAB for B.Sc. Project
- Android software about speech based simplex optimization for Operational Research Course – Operational Research Final project
- Full Simulation of JMLR paper “Bounding the Probability of Error for High Precision Optical - Character Recognition over Shiraz Vehicles Plaque detection (Huang, 2012)”, Project funded by Machine Vision Lab.
- Created OCR-Calculator using ATMEGA32 AVR Microcontroller and GLCD and Resistive Touch
- Automatic English-Persian sentence aligner in machine translation
- Manual object labeller for computer vision database creation
- Design and implementation of object governor and robot detector under OPENCV and robot movements using AVR
- Design and implementation of machine learning for food quality assessment by scratch sound – Instrumentation lecture final project
- Automatic plaque detection system under C# for transportation control service
- Face Morphing/warping/pre-processing toolbox development

2013-2017

**Project and Development**, Tehran Polytechnic University

- Training and testing on recurrent neural network for automatic speech classification (Neural networks lecture final project)
- Fuzzy mutual information used for density estimation (Fuzzy systems lecture final project)
- Statistical detection approach for discriminative classifier in BCI spellers (Simulation for final project: Detection and estimation lecture)
- Burst Analysis on dynamic synchronization of group neurons of more than 3 in brain – Electrophysiology lecture final project
- Stationary subspace analysis and spectral estimation of speech imagery EEG data – DSP II lecture final project
- Corpora development for machine learning based sentence translation
- Optimization metaheuristic toolbox
- Subspace learning brain computer interface toolbox
- Mixture model based independent component analysis toolbox
- Automatic parameter tuning toolbox for machine learning/optimization/signal processing applications

2018-2020

**Research and Software development**, Shiraz - Iran

- Classification Model and Software Design for semi-automatic Machine Translation
- High Precision for detecting low-quality visual objects by reliability metrics and data pruning classifier (Classifier: AlexNet + SVM)
- A neural knowledge graph embedding model for Relaxing ProjE Graph Embedding to tackle high entity-sensitivity to one relation and insensitivity to others. (Torch)
- Knowledge graph embedding model based on ICA to impose Maximum Dependency Minimum Redundancy among different scales of relations
- Ergonomic Machine Translation system
- Preprocessing and classification of parasites and Infected macrophages in Leishmaniasis patients using Faster RCNN and entropy-pruned Cascade Classifier

2020-2024

**Data Analytics Group**, Kingston – Ontario – Canada

- Designing an interpretable Multimodal Transformer for analysing affective states (part of thesis)

- Predicting Length of Stay of patients using Deep Neural Networks (Undergraduate mentoring)
- Extracting region proposals and detecting fire regions using Faster RCNN, YOLO, and ResNet (BAMlab Funded research)
- Developing a cognitive-inspired reinforcement learning framework by adding metaheuristics to Qlearning and SARSA approaches (Reinforcement Learning Course Project)
- Reproduction of [Bilinear Attention Network](#) paper for visual question answering. (Deep Learning Course project)
- A direct Independent Component Analysis using fuzzy mutual information and a null-space based loss function (Data Analytics Course project)
- Classifying pain levels in Osteoarthritis patients using a nearest neighbour confidence based method (Undergraduate mentoring and approach design)
- Using bidirectional LSTM to classify Osteoarthritis patients (Undergraduate mentoring and approach design)
- Tackling imbalanced breast cancer data with focal loss and layer optimizer in Faster RCNNs (Undergraduate mentoring and approach design)
- A survey of interpretable Machine Learning methods for multimodal fusion applications (part of thesis)
- A knowledge graph embedding based on bi-linearity concept
- Multimodal fusion of ensemble of tree-based ensembles for clinical diagnosis of early Alzheimer's Disease in Ontario, Canada
- Global Interpretation of tri-modal trends in multimodal emotion and sentiment datasets
- Cross-modal interpretation of affects by tree-based models (Linear Discriminant XGBoost/AdaBoost)
- Interpreting Long Multimodal Sequences with 2-gram s noisy channel model and Beam Search

# Mojtaba Moattari

For Career: passionate in Cognition & AI for Social Good // Personally: interested in mindfulness & exploring nature

## PERSONAL INFORMATION

### WORK EXPERIENCE

#### Colors Instruction

Skillful  
Innovative  
Creative  
Perceptive

General Purpose (3yr)  
Educational Tech (12yr)  
Programming Languages  
Recommendation Systems (4yr)  
Generative AI (4yrs)  
Machine Learning (12yr)  
Image Processing (I, II)  
Multimodal Fusion (III)  
Explainable AI (III)  
Database/ Deployment (4yr)  
Natural Lang. Process. (7yr)  
Visualization Tools (7yr)  
Graph Embedding (II, III)  
Libraries & Platforms (7yr)

## EDUCATION

2009 – 2013

B.Sc. in Electrical & Computer Engineering ([Click for thesis in a glance](#))

- Processing human **speech**, Generating speech from text. Shiraz University, Shiraz, Iran

2015 – 2017

M.Sc. in Cognitive Neuroscience: ([Click for thesis in a glance](#))

- Classification of human **brain data**, Controlling PC by imagery. Polytechnic University, Tehran, Iran

2020 – 2024

Graduate RA in Computer Science: ([Click for thesis in a glance](#))

- Classify human language. Interpret **affects** by Audio, Visual & Language. Queen's Uni., Canada

Teaching / TA  
Certificates  
Mentorship (with linked projects)  
Mentorship (with linked projects)  
Mentorship (with linked projects)

Digital Skills  
Personality Traits  
Honours  
Invention  
Courses  
Tutoring

## SELECTED PROJECTS

2018-2020  
2016-2018  
2020-2021  
2021-2022  
2012-2014  
2014-2016

Dimensionality Reduction Workshops (1yr), Matlab GUI Workshops (1yr), C++ (3yr), Python (1yr)

Entrepreneurship Course, Know About Business course, SQL (Hackerrank), Deep Learning Coursera

Supervised 3 undergraduate students in 2021: (linked reports: [Fu Z.](#), [Jia F.](#), [Gu T.](#))

Supervised 3 undergraduate students in 2022 (linked reports: [Shu B.](#), [Pattoo A.](#), [Li X.](#))

Mentored 3 graduate students in 2022 (linked reports: [Kokel V.](#), [Sadman N.](#), [Eshghanmalek M.](#))

Information processing | Communication | Content creation | Safety | Problem solving

**Enthusiasm** Confident Flexible Tolerant **High-integrity** Professional Integrity **Out-of-Box-Thinker**

Selected Reinforcement Learning Project, CS Olympiad Winner, Among Top 1% in nationwide-exams

Anti-Theft adapter, Transformer-Leakage Remover, **OCR** based scientific calculator

**Deep Learning**, **Data Analytics**, Computer **Vision**, Biological/ **Statistical/Digital Signal Processing**

Teaching personalized by age with **Piaget** theory of **Cognitive Development** ([Sample](#)), K-12 Education

## SELECTED PUBLICATIONS

- Hogan, I., Qiao, D., Luo, R., Moattari, ... & Breton, M.. **FireWarn: Hazards Detection Using Deep Learning Models**. In 2021 IEEE 3rd International Conf. on Cognitive Machine Intelligence (CogMI). [Best paper](#). ([Link](#))

- Moattari, M., Moradi, M., 2020. **Conflict Monitoring Optimization Heuristic Inspired by Brain Fear and Conflict Systems**. International Journal of Artificial Intelligence. (Inspired by human cognition) ([Link](#))

- ProjB: An Improved Bilinear Biased ProjE model for Knowledge Graph Completion., ([Link](#))

- An Interpretable Cognitive-inspired Method for Multimodal Language Analysis, ([Link](#)) ([Link](#)) ([MiniBook](#))



IDENTIFYING SPEECH IMAGERY USING DICTIONARY LEARNING METHODS IN BRAIN

Mojtaba Moattari

Supervisor: Prof. M.H. Moradi

Electrical and Computer Engineering Department, Tehran Polytechnique University



## PROBLEM DESCRIPTION

- Neural Disorders like ALS /Locked In/, Disabled Patients  
Inability to Establish Effective Communication with Environment

**COGNITIVE INSPIRATIONS**

Journal of Cognitive Psychology, Volume 26, October Edition of Authors  
ISSN 0266-4537 • ISSN 1464-0748 (electronic) • DOI: 10.1080/02664530902910300  
hosted online by Blackwell Publishing

- # OBJECTIVE

  - Unified Objective Functions
  - Discriminative Terms / Constraining Regularizations / Smoothing / Sparsity/Denosing / Filtering / Unified Optimization Trends
  - Combining Discrimination and Feature engineering
  - Discriminative Spatial Filters and Dictionary based Sparse coding
  - Independent Component Analysis With data-driven distributions
  - Using Data Driven Atoms for speech imagery
  - Speech imagery dataset / Six subjects, 4 male, 2 female
  - All right handed / 16 electrodes.: 10-20 Standard
  - Sampling frequency: 512 hz / Fixation Cross (2sec) · Phoneme Shape (1sec) · Speech Imagery (4sec) · Rest State (3sec)9 experiments, 4 session

Designed by Rostami et al. (2014)

ABSTRACT

- Discriminative Terms / Constraining Regularizations / Smoothing
  - / Sparsity/ Denoising / Filtering / Unified Optimization Trends
  - Discriminative Spatial Filter and Dictionary based Sparse coding
  - Independent Component Analysis With data-driven distributions
  - Using Data Driven Atoms for speech imagery

**DATA**

  - Speech imagery dataset / Six subjects . 4 male, 2 female
  - All right handed / 16 electrodes : 10-20 Standard
  - Sampling frequency: 512 hz / Fixation Cross (2sec) · Phoneme Shape (1sec) · Speech Imagery (4sec) · Rest State (3sec)
  - experiments, 4 session

Designed by Rosami et al. (2014)

## FEATURE EXTRACTION

- Rayleigh Quotient (Generalized Eigenvalue formulation)
  - Common Spatial Pattern / Fuzzy CSP /
  - Fukunaga-kontz Transform
  - Higher orders of nongaussianity ICA
  - Nonlinear POICARE SPACE component analysis
  - Nonlinear dynamic features:

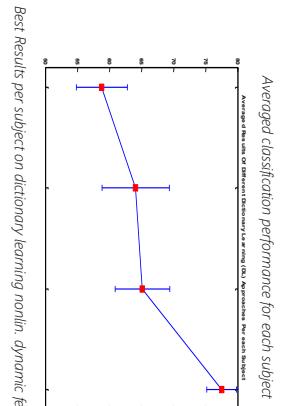
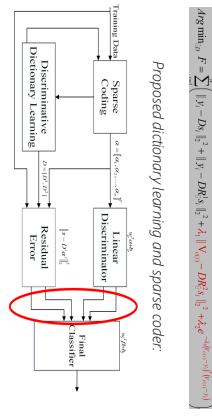
$X(m) = \sum_{n=1}^N \eta(n) \psi(f - n\varphi) + \varepsilon(m)$

$\lambda = \frac{d\psi}{d\varphi}|_{\varphi=0}$

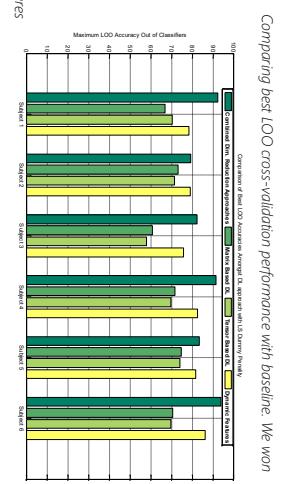
$D = \frac{\lambda^2}{\lambda^2 + 1}$

$\sigma^2 = \frac{1}{N} \sum_{m=1}^M \varepsilon(m)^2$

$\text{Var}(\psi(E(X))) = \frac{1}{N} \sum_{m=1}^M \text{Var}(\psi(f - m\varphi)) = \frac{1}{N} \sum_{m=1}^M \text{Var}(\psi(f)) = \sigma^2$



### *Averaged classification performance for each subject*



Maximum LOO Accuracy Out of Classifiers

Legend:

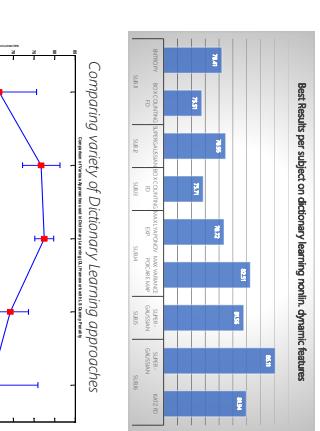
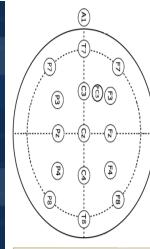
- Optimized Data Model & Knowledge
- Model Based DL
- Deep Learning

Dataset	Optimized Data Model & Knowledge	Model Based DL	Deep Learning
Sanger	~88	~85	~85
Sanger 2	~88	~85	~85
Sanger 3	~88	~85	~85
Sanger 4	~88	~85	~85
Sanger 5	~88	~85	~85
Sanger 6	~88	~85	~85
Sanger 7	~88	~85	~85
Sanger 8	~88	~85	~85
Sanger 9	~88	~85	~85
Sanger 10	~88	~85	~85

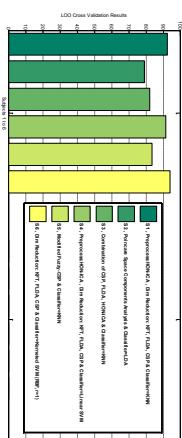
Previous research has lower performance in the best results

Speed

- Sampling frequency: 512 Hz / Fixation Cross (2sec) . Phoneme Shape (Ised) . Speech Imagery (4sec) . Rest State (3sec) experiments, 4 session



Best Practices for Algorithmic Transparency



- Work on fisher CSP as feature extraction / improve Fisher-CSP
- Delve into tempo-spectral features/ Use Heisenberg Uncertainty
- Another Fuzzy-CSP improvement using supervised clustering

- ## REFERENCE:

Rosatini, M., & Moradi, M.H. (2015, November). Evolutional multi-band common spatial pattern in brain computer interface. In 2015 22nd Iranian Conference on Biomedical Engineering (ICBME) (pp. 16-20). IEEE.

# Cognitive Inspired Multimodal Data Analysis and Interpretation: Application to Behavior Recognition



Queens  
UNIVERSITY

## description of the problem

- Having accuracy and interpretability for multimodal behavior classification.
- Interpret both samples (local) and datasets (global)
- Consider the built's most defining cognitive rules
- Capture globally relevant information
- Consider behavior (noisy, stochastic, uncertain, biological complexity, informative, model/plastic, hybrid inductive bias, self-awareness, disorder, error)
- keys to the success is a state-of-the-art multimodal attention-based model
- drawing on cognition to improve attention-based multimodal behavior patterns computing

## Challenges

- Capture multimodal information + additional information
- design a multimodal fusion model that is both accurate and interpretable
- design a more trimodal approach for a more holistic interpretation of multimodal affective-data
- Extract important local and global multimodal features
- SOTA multimodal transformers

## Data

- CMU-MOSI: audio/video/text sentiment dataset
- CMU-MOSEI: audio/video/text dataset on feelings/emotions
- IM3OCAP: Emotion A/V/T data (happy/sad/mugry/neutral)
- Student behavior or data task: classification
- Pre-Data: target statistics, Table: Samples from each dataset
- Testing process:
  - Remove abandoned layers, enable evaluation mode
  - Exploit domain cross-stimulation weighting coefficients for interpretation / Use F1, AUC and Recall as evaluation metrics / Compare with SOTA models
- Visualize with t-SNE and chord diagrams

**Queens Comp**

SCHOOL OF COMPUTER SCIENCE

Queens University

Ontario Research Foundation

McGill University

McGill University