

DAVOOD WADI

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Skills Summary

Interests:

- Computer vision
- NLP
- AI in Marketing

Top skills:

- Consumer Behavior
- Artificial Intelligence (Computer Vision, Large Language Models, Generative AI)
- Research Methods and Experiment Design
- Python (PyTorch, TensorFlow, Transformers), R, SPSS
- Consumer Neuroscience and Psychophysiology (Eye-tracking, EEG, fMRI)

Education

PhD in AI and Marketing | HEC Montréal

Aug 2019 – Aug 2023

M.Sc. Marketing | Sharif University of Technology

Sep 2016 – Jul 2018

B.Sc. Computer Science | Sharif University of Technology

Sep 2011 – Jul 2016

B.Sc. Theoretical Mathematics | Sharif University of Technology

Sep 2011 – Jul 2016

Minor in Economics | Sharif University of Technology

Sep 2011 – Jul 2016

Experiences

Lecturer – HEC Montréal

MATH 60629A - Machine Learning I: Large-Scale Data Analysis and Decision Making

- Supervised learning
- Non-supervised learning
- Recommender systems
- Multi-arm bandits
- Reinforcement learning
- Sequential decision making

Curriculum design

- Homework assignments
- Term project
- Final exam
- Convolutional neural networks module
- K-means clustering module

[\(link\)](#)

Aug 2023 – Present

Instructor – Great Learning

Teaching

- MIT Applied Data Science Program
- Deep Learning for Computer Vision course
- Deep Learning for NLP course

Video lectures and curriculum design for

- Deep Learning for Computer Vision course (core modules)
- MIT Applied Data Science Program (code-along)

Committee member for live final presentations

Monthly masterclasses for the promotion of the MIT ADSP program [\(link\)](#)

May 2022 – Present

Scientist in Residence, Voipe Medical

- Leading the R&D research team in identification of relevant issues to be tackled and state-of-the-art methods and technology tools.
- Taking concrete action in knowledge transfer from academia to industry.
- Contributing to the growth of Québec startups at the leading edge of technological advances in artificial intelligence.
- Developing customized training and coaching to help Voipe.ai establish itself as a scientific leader in the medical industry.

May 2022 – Sep 2022

Consumer Behavior Researcher, Tech3Lab - HEC Montréal

- Incorporating statistical modeling, machine learning, and AI methods in analyzing psychophysiological data from eye-tracking, EEG, fMRI, GSR, etc. sources to better understand consumer behavior and improve user experience in e-commerce applications
- Producing original research and scientific publications.
- Leading master's students in carrying out academic research.

Aug 2019 – Aug 2023

Management and Accounting Lecturer, Islamic Azad University

Statistics & Applications in Management; Research Methodology I; Introduction to Marketing

Sep 2016 – July 2019

Researcher, Islamic Azad University

Carrying out Research in the Department of Management and Accounting

Oct 2016 – July 2019

Research Assistant, Islamic Azad University

Carrying out Research in the Department of Chemistry

Oct 2013 – Sep 2016

Interim Strategic Planning Analyst, Tavana Energy Company (TECO)

Devised the Road Map and Business Plan of the Company to Become One of the Country's Largest Private Oil and Gas Enterprises

Mar 2016 – July 2016

R Instructor, The Way Institute

Teaching Basic and Intermediate R Applications in Economics and Finance

Nov 2012 – June 2019

BaharAram.com

Market Analyst

Sep 2016 – Aug 2019

BaharAram.com

Full-Stack Developer

Jul 2011 – Sep 2016

Honors and Awards

Best PhD Thesis Award Nominee – HEC Montréal

August 2023

IVADO Scientist in Residence Scholarship Laureate

May 2022

The IVADO “Scientist in Residence” program is aimed at startups seeking the scientific expertise of a PhD student in artificial intelligence or data science so as to acquire new skills as well as validate and guide their R&D projects and move them in the right direction.

Awarded for Vope Medical

IVADO PhD Excellence Scholarship Laureate

May 2020

These scholarships support research in the areas delineated in our Canada First funding proposal: data science in the broad sense, encompassing methodological research in data science (machine learning, operations research, statistics) and its applications in multiple sectors, including our priority sectors (health, transportation and logistics, energy, business, and finance) and any other sector of application (e.g., sociology, physics, linguistics, engineering).

[link](#)

2019 Saskatchewan Innovation & Opportunity Scholarship

Mar 2019

These scholarships were established by the provincial government to match contributions from private donors and to support innovative research in the University of Saskatchewan's signature areas to help build a strong future for Saskatchewan.

ICPR 2020 Competition on Text Block Segmentation on a NewsEye Dataset / Ranked 2nd Overall

Jan 2021

"We propose a standard data science competition on Text Block Segmentation to analyze the structure of historical newspaper pages. In contrast to many existing segmentation methods, instead of working on pixels we want to cluster baselines / textlines into text blocks / paragraphs. Therefore, we introduce a new measure based on a Baseline Detection evaluation scheme. But also common pixel-based approaches can participate without restrictions. Working on baseline level addresses directly the application scenario where for a given image the contained text should be extracted in blocks for further investigations."

Keywords: Document Image Analysis, Historical Documents, Layout Analysis, Text Block Segmentation, Baseline Detection

[link](#)

ACM Papers Subject-Area Detection Using Citation Networks and Paper Title / Ranked 2nd Overall

Feb 2020

Kaggle competition - Ranked 2nd

[link](#)

Teacher of the Year Award – Islamic Azad University

May 2018

Member of the National “Exceptional Talents”

Since Jan 2012

Obtained the highest GPA in the entire Sharif University of Technology

Jun 2016

Ranked among the top 0.02 % of the 1.4 million participants in the Iranian University Entrance Exam (Konkur).

Jun 2011

Publications

The Interplay of Altruism and Financial Incentives: Maximizing Online Reviews through Effective Messaging (Management Science – Under Review)

June 2023

Retailers have been increasingly soliciting online reviews from their customers, sometimes with the provision of financial incentives. In this research, we explore how the interplay between prosocial reinforcement of consumers and financial incentives affects their decision to review. Specifically, we investigate how incentivized review solicitation messages that direct consumers' attention to the benefits of their review for other consumers (pure altruism) induce a pure altruistic mindset and lead to more review decisions, compared to messages that direct reviewers' attention to the benefits of their review for the company (reciprocal altruism). We test our hypotheses in two controlled experiments and a field study in collaboration with a major North American online retailer. Our findings show that reinforcing reciprocal altruism has a negative interaction with financial incentives, while reinforcing pure altruism is not affected by financial incentives. We contribute to the scant literature on the role of altruism in eWOM creation and propose a cost-effective and simple modification to review solicitation messages to boost review volume.

Be careful what you pay for: The effect of performance contingent incentives for online product reviews (Journal of Retailing – Under Review)

July 2023

With increasingly more customers basing their purchase decisions on online product reviews, many retailers have adopted various incentivization methods to attract higher-quality reviews for their products. Prior research has studied different incentivization schemes to promote the creation of high-quality reviews. This research investigates a performance-contingent incentive that incentivizes the entire review community using a fixed incentive budget. We test our hypotheses in a controlled experiment and a field study in collaboration with a major North American online retailer. We find that performance-contingent incentives increase review length, but the increase is moderated by reviewer experience. Experienced reviewers have established reciprocal exchange motives and are not affected by performance-contingent incentives. In contrast, first-time reviewers lack well-established motives to write reviews and show significant improvement in their review length when exposed to performance-contingent incentives. Finally, given that performance-contingent incentives reinforce reciprocal motives, we find that reinforcing other motives, such as pure altruism, backfires and reduces review length. Our findings show that the efficacy of providing performance-contingent incentives and reinforcing pure versus reciprocal altruism depends on the percentage of first-time reviewers on a given platform and the outcome of interest (i.e., review rate, helpful review rate, or cost per helpful review) to the retailer. We provide managers with a concrete set of guidelines to choose the appropriate incentivization scheme and altruism reinforcement based on their platforms' reviewer experience and their outcome of interest. Our guidelines can help managers save costs and increase helpful reviews on their platform.

Read the signs: Towards Invariance to Gradient Descent's Hyperparameter Values (ICML 2022 – Phase I accept)

Feb 2022

We propose ActiveLR, an optimization meta-algorithm that localizes the learning rate and adapts them at each epoch according to whether the gradient at each epoch changes sign or not. This sign-conscious algorithm is aware of whether from the previous step to the current one the update of each parameter has been too large or too small and adjusts the α accordingly. We implemented the Active version (ours) of widely used and recently published gradient descent optimizers, namely Adam, RAdam, and AdaBelief. Our experiments on ImageNet, CIFAR-10, and WikiText-103 using different model architectures, such as ResNet and Transformers, show an increase in generalizability and training set fit, and a decrease in training time for the Active variant of Adam, RAdam, and AdaBelief. The results also show robustness of the Active variant of these optimizers to different values of the initial learning rate. Furthermore, the detrimental effects of using large batch sizes, which are crucial in training large-scale datasets and high-performance computing, are mitigated. ActiveLR, thus, eliminates the need for hyper-parameter search for the optimal initial learning rate and batch size, two of the most commonly tuned hyper-parameters that require heavy time and computational costs to pick and further tuning of the learning rate throughout the training process. We encourage AI researchers and practitioners to use the Active variant of their optimizer of choice instead of its original, vanilla form for faster training and better generalizability.

LabSynth: Label Synthesis Algorithm for AI Domains with Limited Labelled Data

Nov 2021

The main goal is to obviate the need for manual annotation of images for semantic segmentation tasks. Now we can produce bounding boxes, masks, and generate new images for training, all in one shot, without human intervention at exponentially higher speed. In other tasks, such as image to image deep learning applications (e.g., document binarization), LabSynth surpasses state-of-the-art results by generating unlimited permutations of the input image datasets.

Furthermore, we used LabSynth as an image augmentation technique. The results show that LabSynth-augmented image data improves image classification and detection accuracy. This improvement is due to the pooling of object elements across the instances of the dataset, which not only increases its training instances, but also prevents overfitting by separating objects from the backgrounds in the dataset.

Applicable to fields with limited ground truth labels, such as document restoration, image segmentation (e.g., website segmentation).

12D: Alternative Representation of Eye-Tracking Stream Data as 2D Images

Sep 2020

The current approach to using eye-tracking data as streams of tabular data in deep neural networks has shown poor performance in tasks such as cognitive load prediction. We propose an alternative feature representation of eye-tracking data as gazeplots to be fed into a CNN. The results show significant improvements over the traditional methods in predicting cognitive load, perceived difficulty, and confidence.

Our promising results suggest that we can eliminate the use of EEG, which is expensive, non-scalable, and intrusive, and replace it with the more affordable, portable, and accessible eye-tracking devices to predict consumers' cognitive variables.

AOIgen: Automatic Website Area of Interest Detection

Aug 2020

Detection of objectively identifiable objects in an image has shown success in the last decade. There is a preponderance of datasets that are hand-annotated to segment pedestrians, vehicles, animals, landmarks, etc., from the background. Detection in other domains such as elements of a website, however, is a challenging task. First, one researcher's conceptualization of an element in a website might differ from another researcher's. Moreover, the level of granularity of the Areas of Interest (AOIs) differs from task to task. For instance, on an online retailer's webpage, the "buy" button, by itself, might be considered a single element for one research task and the "buy" button along with the product price, together, might be considered a single element for another research task. As a result, the subjective nature of AOIs on a webpage makes it impossible to hand-label a comprehensive webpage AOI dataset.

We propose AOIgen, which automatically generates webpages with their corresponding bounding boxes and segmentation masks using only a few instances of each element. Our tests show that AOIgen's performance is on par with hand-labelled datasets. Therefore, we encourage researchers and practitioners to employ AOIgen instead of hand-labelling their data separately for each task to eliminate the cost, time consumption, and error associated with hand-annotating images.

Projects

Cognition-Based Auto-Adaptive Website User Interface in Real Time

May 2020 – Present

A personal message that is designed specifically for the need and taste of consumers has always been the goal of media outlets, retailers, and social activists. Here at Tech3Lab, we are launching this massive study of personalization in an unprecedented way: by analyzing neurophysiological and psychophysiological signals of the body to determine the best

possible look and feel on websites to improve user experience and best convey the intended message.

Previously, auto-adaptive website personalization was carried out mostly by guesswork and theory, in which there is no real evidence for the parameters used. Thanks to the equipment in Tech3Lab, such as EEG, fNIRS, physiological measurement instruments, and eye tracking measures, we are able to base our adaptive system on direct signals from the body.

This interdisciplinary study of cognitive neuroscience, marketing, and data science has the potential to revolutionize the approach of designers, developers, and editors to website design by studying auto-adaptive websites using direct body measures.

[Winner of IVADO Doctoral excellence scholarship](#)

Licenses and Certificates

Deep Learning Specialization - Coursera

Nov 2020

[Credential URL](#)

TensorFlow in Practice Specialization - Coursera

Jun 2020

[Credential URL](#)

Duolingo French Fluency: Intermediate - Duolingo

Oct 2015

[Credential URL](#)

Volunteering

Pro Bono Assistance - Sharif Yarigaran

Oct 2015 – Sep 2016

- Helping poor children study and prepare for enrollment in colleges and universities.
- Fundraising for children of labor

Pro bono Instructor - Dibagaran Language Institute

Aug 2016

- Helping underprivileged student prepare for IELTS and TOEFL.

Volunteer in Move-in Day - Brock University

Sep 2017

- Move-in day – helping new students move their luggage and belongings to their residence and trying to make their first day at the university an memorable one.

Languages

- English: fluent
- French: working proficiency
- Persian: native

Skills

Academic research | Machine Learning | Python | TensorFlow | PyTorch | R | Data Analysis
| Eye-Tracking | EEG | fMRI | GSR | Neuroscience | Psychophysiology | Consumer Behavior
| UX Design