Homa Rashidisabet

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🔄 May 2024

EDUCATION	**University of Illinois Chicago (UIC), Chicago, IL**	Spring 2021 - (Expected) Fall 2024
	Ph.D. in: Biomedical engineering	
	Area of research: Biomedical Computer Vision	
	University of Illinois Chicago (UIC), Chicago, IL	Fall 2018 - Spring 2021
	MS. in: Biomedical engineering	
	Area of research: Artificial Intelligence	
	University of Tehran (UT), Tehran, Iran	Fall 2012 - Spring 2016
	B.Sc. in: Applied Mathematics	

WORK EXPERIENCE

— Working as Research Assistant at **Artificial Intelligence In Ophthalmology (AI-O) Center**, Department of Ophthalmology and Visual Sciences, University of Illinois Chicago.   *Feb 2021 - Present*

— Worked as AI Scientist Intern at **Carl Zeiss Meditec, Inc**.   *May - Dec 2022*

— Worked as Research Assistant at **BiAffect**, a university startup company, University of Illinois Chicago.   *Jan 2019 - Jan 2021*

— Worked as Research and Development Data Scientist intern at **Johnson and Johnson (JnJ), Inc**.   *May - Sep 2020*

— Worked as Teaching Assistant (TA) at Bioengineering Department, University of Illinois Chicago.   *Spring 2019- 2021*

— Worked as TA at Department of Mathematics, Statistics, and Computer Science, University of Tehran.   *Fall 2015*

RESEARCH INTEREST

— Using AI to transform medicine from a reactive to a proactive discipline.

— Developing AI methods for abnormality detection from biomedical images, and timeseries signals.

— Improving certainty and generalizability of AI models for a potential clinical translation.

JOURNAL PUBLICATION

— **Rashidisabet, H.**, Sethi, A., Jindarak, B., Edmonds, D., Chan, P., Leiderman, Y., Vajaranant, T., Yi, D. Validating the Generalizability of Ophthalmic Artificial Intelligence Models on Real-World Clinical Data. *Translational Vision Science & Technology.* **Link**   *Nov 2023*

— S. Vairavan, **Rashidisabet, H.**, [and 11 others, including Vaibhav A. Narayan]. Personalized Relapse Prediction in Patients with Major Depressive Disorder using Digital Biomarkers. *Scientific Reports.* **Link**   *Oct 2023*

— **Rashidisabet, H.**, Vajaranant, T., Yi, D. A Systematic Review on Glaucoma Diagnosis Using Ophthalmic Imaging Data via Deep Learning. *Eye.* **Link**   *April 2023*

— Hussain, F., Stange, J.P., Langenecker, S.A., McInnis, M.G., Zulueta, J., Piscitello, A., Ross, M.K., Demos, A.P., Vesel, C., **Rashidisabet, H.**, and Cao, B. Passive Sensing of Affective and Cognitive Functioning in Mood Disorders by Analyzing Keystroke Kinematics and Speech Dynamics. *In Digital Phenotyping and Mobile Sensing (pp. 229-258). Springer, Cham.* **Link**   *July 2022*

— **Rashidisabet, H.**, Ajilore, O., Leow, A., and Demos, A. Revisiting Power-Law Estimation with Applications to Real-World Human Typing Dynamics. *Physica A: Statistical Mechanics and its Applications.* **Link**   *April 2022*

— **Rashidisabet, H.**, Thomas, P., Ajilore, O., Zulueta, J., Moore, R., Leow, A. A Systems Biology Approach to The Digital Behaviorome. *A Current Opinion in Systems Biology.* **Link**   *July 2020*

— Vesel, C., **Rashidisabet, H.**, [and 16 others, including Leow, A.]. Effects of Mood and Aging on Keystroke Dynamics Metadata and Their Diurnal Patterns in A Large Open-Science Sample: A BiAffect iOS Study. *Journal of the American Medical Informatics Association.* **Link**   *May 2020*

WORKING PAPER

— **Rashidisabet, H.**, Chan, P., Vajaranant, T., Yi, D. Out-of-Distribution Detection via Uncertainty Quantification in AI-Aided Glaucoma Diagnosis. Under-review at *International Conference on Medical Image Computing and Computer-Assisted Intervention (MICCAI).*   *March 2024*

— **Rashidisabet, H.**, Chan, P., Leiderman, Y., Vajaranant, T., Yi, D. An Innovative Approach for Improving Glaucoma and Diabetic Retinopathy Classification Performance in Small Data Regime via Segmentation. In preparation for submission to *PLOS One.*

— **Rashidisabet, H.**, Chan, P., Leiderman, Y., Vajaranant, T., Yi, D. Self-Censorship via Uncertainty-Aware Deep Learning for Reliable Glaucoma Prediction. In preparation for submission to *Translational Vision Science & Technology.*

TECHNICAL SKILL

— Programming language: Fluent in Python, and R. Experienced in C++, and Java   *Since 2018*

  • Python package: NumPy, Pandas, SciPy, scikit-learn, PyTorch, Nevergrad, PyOD, Matplotlib

  • R package: dplyr, corrplot, psych, caret, logspline, fitdistrplus, lme4, lmerTest

Award and honor	— Won the UIC Biomedical Engineering Research Assistant Superior Performance (RASP) Award for outstanding achievement, endorsed by faculty and the Department Head of Biomedical Engineering at UIC, Chicago, IL.	Spring 2024
	— Won David R. Pepperberg Award for Best Scientific Presentation at ARVO 2022 conference from Department of Ophthalmology and Visual Sciences, UIC, Chicago, IL.	Spring 2022
	— Won travel grant award in National Network of Depression Centers **(NNDC)** conference.	Fall 2019
	— Doctoral scholarship, Department of Biomedical Engineering, UIC, Chicago, IL.	Since Fall 2018
	— Governmental scholarship, Department of Mathematics, Statistics and Computer Science, UT, Iran.	2012 - 2016

Service	— Reviewer for Springer Nature Ophthalmology and Therapy.	April 2023 - Present
	— Reviewer for Medical Physics Journal.	Jan 2022 - Present
	— Reviewer for NewInML @ ICML 2022 workshop. **Link**	May 2022 - Present
	— Reviewer for NewInML @ NeurIPS 2021 workshop. **Link**	Sep 2021 - Present
	— Reviewer for NewInML @ NeurIPS 2020 workshop. **Link**	Sep 2020 - Sep 2021

Research Experience

Biomedical Computer Vision

	— Proposed a domain adaptation model to enhance generalization on Out-of-Distribution fundus images gathered from diverse institutions, varying protocols, and diverse patient populations.	Jan 2024 - Present
	— Developed a novel parameter-free algorithm through uncertainty quantification to self-censor network's unreliable predictions that are associated with high uncertainty when the model does not have enough information to make a confident decisions for glaucoma prediction using fundus images.	Jan 2024 - April 2024
	— Proposed an Out-of-Distribution detection approach though a deep evidential uncertainty quantification to mitigate the Softmax overconfidence avoiding to pose unreliable glaucoma diagnosis risk at patients.	Feb 2022 - Jan 2024
	— Customized the Classification via Segmentation (CvS) method for addressing the small-labeled data challenge in glaucoma and diabetic retinopathy classification applications using fundus images.	Dec 2022 - Present
	— Proposed self-supervised deep learning-based models (e.g., SimCLR, DINO) for accurate classification of eight distinct abnormalities in B-scan images obtained from volumetric OCT data, where a vast majority of the data was unlabeled, with only a small portion labeled.	May 2022 - Dec 2022
	— Proposed a robust and generalizable segmentation model utilizing vision transformers (ViT) to accurately segment subtle retinal layers in OCT images, showcasing efficacy across diverse devices and scan patterns.	Aug 2022 - Dec 2022
	— Proposed a semi-supervised deep learning model via label propagation to segment the Optic Nerve Head in fundus images, even with as few as 2 labeled images, addressing small-labeled data challenges.	March 2021 - Sep 2022
	— Proposed generalizable and explainable deep learning models for Optic Nerve Head segmentation and glaucoma classification in fundus images, leveraging the Grad-CAM technique, hyper-parameter tuning, augmentation, regularization, and transfer learning to enhance performance and interpretability.	Feb 2021 - June 2022

Biomedical Data Science

	— Developed a novel Long Short-Term Memory-based Encoder-Decoder method, termed EncDec-AD, for multi-variate time-series Anomaly Detection, enabling high-accuracy prediction of depression relapse at an individual patient level 21 days in advance, utilizing sensor time-series big data collected through wearable devices every 30 milliseconds over one year.	May 2020- June 2022
	— Benchmarked our EncDec-AD method against more than 10 different machine learning anomaly detection methods available in the PyOD Python package (e.g., LSCP, XGBOD, VAE, IForest, and kNN).	May 2020- June 2022
	— Leveraged a diverse range of supervised and unsupervised machine learning methods for data mining and feature engineering from raw time series and text data collected through typing on smartphone devices or accelerometer data from wearable watch devices.	Feb 2019- Jan 2020
	— Developed a novel statistical method to reliably model the smartphone keyboard typing interactions at the individual user level as a power law distribution, utilizing features engineered from raw sensor timeseries big data collected from smartphone devices, including metrics such as typing speed and typing delay.	March 2020 - April 2022
	— Modeled the associations between smartphone interaction, depression, age, and diurnal patterns using statistical mixed effect models using sensor data collected through smartphone keyboard typing data.	Feb 2019 - May 2020
	— Leveraged a diverse range of supervised (e.g., KNN, Decision Tree, Random Forest, SVM, XGboost) and unsupervised (e.g., GMM, K-Means) machine learning models to predict depression, depression relapse, and bipolar disorders using sensor data.	Feb 2019 - Feb 2021

PRESENTATION — **Rashidisabet, H.**, Chan, P., Vajaranant, T., Yi, D. Out-of-Distribution Detection via Uncertainty Learning for Robust Glaucoma Prediction. *Society for Imaging Informatics in Medicine (SIIM).* — June 2024

— **Rashidisabet, H.**, Chan, P., Vajaranant, T., Yi, D. Out-of-Distribution Detection via Uncertainty Learning for Robust Glaucoma Prediction. *The Association for Research in Vision and Ophthalmology (ARVO).* — May 2024

— **Rashidisabet, H.**, Chan, P., Vajaranant, T., Yi, D. Out-of-Distribution Detection via Uncertainty Learning for Robust Glaucoma Prediction. *The Collaborative Community on Ophthalmic Imaging Foundation (CCOI).* **Link** — Jan 2024

— **Rashidisabet, H.**, Vajaranant, T., Yi, D. Generalizable AI-Based Glaucoma Prediction via A Stable Model Selection Method. *American Academy of Ophthalmology (AAO).* **Link** — Oct 2023

— **Rashidisabet, H.**, Vajaranant, T., Yi, D. Generalizable AI-Based Glaucoma Prediction via A Stable Model Selection Method. *ARVO.* **Link** — April 2023

— **Rashidisabet, H.**, Chan, P., Vajaranant, T., Yi, D. Real-World Data Generalization for Glaucoma Prediction. *ARVO.* **Link** — May 2022

— **Rashidisabet, H.**, Sethi, A., Jindarak, B., Edmonds, D., Chan, P., Vajaranant, T., Yi, D. Importance of Generalizations to Clinical Settings through Glaucoma Classification and Optic Nerve Segmentation. *AAO.* — Oct 2022

— **Rashidisabet, H.**, Vajaranant, T., Aref A., Edward D., Yi, D. AI-Based Glaucoma Prediction in Glaucoma Suspects. *American Glaucoma Society (AGS).* — Nov 2022

— **Rashidisabet, H.**, Sethi, A., Jindarak, B., Edmonds, D., Chan, P., Vajaranant, T., Yi, D. Validating the Generalizability of Ophthalmic Artificial Intelligence Models on Real World Clinical Data. Invited talk at *30th Glaucoma Symposium, UIC.* — May 2022

— **Rashidisabet, H.**, [and 16 others, including Leow, A.]. Characterizing Passively Collected Real-World Keyboard Dynamics in Mood Disorders as A Function of Age and Time-of-Day. *Biological Psychiatry.* **Link** — May 2020

— Vesel, C., **Rashidisabet, H.**, [and 16 others, including Leow, A.]. Diurnal Patterns as Evidenced by Over Eleven Million Smartphone Keystrokes During Daily Usage: An iOS BiAffect Study. **Award-winning poster** in *Annual National Network of Depression Centers Conference*; Ann Arbor, MI. **Link**. This poster is also presented at *ACNP 58th Annual Meeting: Poster Session II. Neuropsychopharmacol.* **Link** — Dec 2019

— Vesel, C., **Rashidisabet, H.**, [and 16 others, including Leow, A.]. Diurnal Patterns As Evidenced by Over Eleven Million Smartphone Keystrokes During Daily Usage: An iOS BiAffect Study. Poster presented at *ACNP 58th Annual Meeting: Poster Session II. Neuropsychopharmacol 2019.* **Link**