Iuliia (Yulia) Kotseruba

Postdoctoral Visitor · Department of Electrical Engineering and Computer Science

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https://scholar.google.com/citations?user=a-UOikoAAAAJhl=en

Education

York University *Toronto, Canada*

PhD Electrical Engineering and Computer Science *2019–2024*

- Advisor: Prof. John K. Tsotsos
- Dissertation title: "Investigating and Modeling the Effects of Task and Context on Drivers' Gaze Allocation"

York University *Toronto, Canada*

MSc Computer Science *2012–2016*

- Advisor: Prof. John K. Tsotsos
- Thesis title: "Visual Attention in Dynamic Environments and Its Application to Playing Online Games"

University of Toronto *Toronto, Canada*

BSc Hons. Computer Science *2006–2010*

- Specialist in Artificial Intelligence

National University of "Kyiv-Mohyla Academy" *Kyiv, Ukraine*

BA Hons. Philosophy *2002–2006*

- Minor in Religious Studies
- Thesis advisor: Prof. Andrii Baumeister
- Thesis title: "On Transcendental Analytic in I. Kant's *Critique of Pure Reason*"

Professional Experience

2024–	**Postdoctoral Visitor**, Tsotsos Lab for Active and Attentive Vision, York University, Canada
2021–2022	**Associate Researcher, Intern**, Noah's Ark Lab, Huawei Technologies, Canada
2016–2019	**Research Associate**, Tsotsos Lab for Active and Attentive Vision, York University, Canada
2014–2016	**Research Assistant (part-time)**, Tsotsos Lab for Active and Attentive Vision, York University, Canada
2010–2012	**Research Programmer**, Jurisica Lab, University Health Network, Canada

Technical skills

Programming Python (proficient), MATLAB (proficient), C/C++ (prior experience), OpenCL/CUDA/OpenGL/GLSL (prior experience), Java (prior experience)

Data analytics Pandas (proficient), NumPy (proficient), Matplotlib (proficient), PostgreSQL (prior experience)

Machine Learning PyTorch (proficient), Tensorflow/Keras (proficient), OpenCV (proficient)

Publications

Books

Kotseruba, I., Tsotsos J.K., "The Computational Evolution of Cognitive Architectures", Oxford University Press (UK), 245 pages (preparing final copy).

Peer-reviewed journals

Kotseruba, I., Tsotsos, J. K. (2022). Attention for vision-based assistive and automated driving: a review of algorithms and datasets. *IEEE Transactions on Intelligent Transportation Systems*, 23(11), 19907–19928.

Tsotsos, J. K., Abid, O., Kotseruba, I., Solbach, M. D. (2021). On the control of attentional processes in vision. *Cortex*, 137, 305-329.

Kotseruba, I., Tsotsos, J. K. (2020). 40 Years of Cognitive Architectures: Core Cognitive Abilities and Practical Applications. *Artificial Intelligence Review*, 53(1), 17-94.

Tsotsos, J. K., Kotseruba, I., Wloka, C. (2019). Rapid visual categorization is not guided by early salience-based selection. *PloS one*, 14(10), e0224306.

Tsotsos, J. K., Kotseruba, I., Rasouli, A., Solbach, M. D. (2018). Visual attention and its intimate links to spatial cognition. *Cognitive Processing*, 19, 121-130.

Rasouli, A., Kotseruba, I., Tsotsos, J. K. (2017). Understanding pedestrian behavior in complex traffic scenes. *IEEE Transactions on Intelligent Vehicles*, 3(1), 61-70.

Tsotsos, J., Kotseruba, I., Wloka, C. (2016). A focus on selection for fixation. *Journal of Eye Movement Research*, 9(5).

Fortney, K., Xie, W., Kotlyar, M., Griesman, J., Kotseruba, Y., Jurisica, I. (2012). NetwoRx: connecting drugs to networks and phenotypes in Saccharomyces cerevisiae. *Nucleic Acids Research*, 41(D1), D720-D727.

Kotseruba, Y., Cumbaa, C. A., Jurisica, I. (2012). High-throughput protein crystallization on the World Community Grid and the GPU. *Journal of Physics: Conference Series*, 341(1), p. 012027.

Peer-reviewed conferences

** equal contribution*

Kotseruba, I., Tsotsos J.K. (2024). SCOUT+: Towards practical task-driver drivers' gaze prediction. In IEEE Intelligent Vehicles Symposium (IV) (**Best Student Paper)**

Kotseruba, I., Tsotsos J.K. (2024). Data Limitations for Modeling Top-Down Effects on Drivers' Attention. In IEEE Intelligent Vehicles Symposium (IV).

Kotseruba, I., Tsotsos, J. K. (2023). Understanding and Modeling the Effects of Task and Context on Drivers' Gaze Allocation. In IEEE Intelligent Vehicles Symposium (IV).

Rasouli, A., Kotseruba, I. (2024). Diving Deeper Into Pedestrian Behavior Understanding: Intention Estimation, Action Prediction, and Event Risk Assessment. In IEEE Intelligent Vehicles Symposium (IV).

Rasouli, A., Kotseruba, I. (2023). PedFormer: Pedestrian behavior prediction via cross-modal attention modulation and gated multitask learning. In IEEE International Conference on Robotics and Automation (ICRA) (pp. 9844-9851).

Kotseruba, I., Rasouli, A. (2023). Intend-Wait-Perceive-Cross: Exploring the effects of perceptual limitations on pedestrian decision-making. In IEEE Intelligent Vehicles Symposium (IV) (**Oral**).

Rasouli, A.*, Kotseruba, I.* (2022). Intend-wait-cross: Towards modeling realistic pedestrian crossing behavior. In IEEE Intelligent Vehicles Symposium (IV) (pp. 83-90).

Kotseruba, I., Rasouli, A., Tsotsos, J. K. (2021). Benchmark for evaluating pedestrian action prediction. In IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) (pp. 1258-1268).

Kotseruba, I., Rasouli, A., Tsotsos, J. K. (2020). Do they want to cross? Understanding pedestrian intention for behavior prediction. In IEEE Intelligent Vehicles Symposium (IV) (pp. 1688-1693).

Rasouli, A., Kotseruba, I., Tsotsos, J. K. (2019). Pedestrian action anticipation using contextual feature fusion in stacked RNNs. In British Machine Vision Conference (BMVC).

Kotseruba, I., Wloka, C., Rasouli, A., Tsotsos, J. K. (2019). Do saliency models detect odd-one-out targets? New datasets and evaluations. In British Machine Vision Conference (BMVC) (**Oral**).

Rasouli, A.*, Kotseruba, I.*, Kunic, T., Tsotsos, J. K. (2019). PIE: A large-scale dataset and models for pedestrian intention estimation and trajectory prediction. In IEEE/CVF International Conference on Computer Vision (ICCV) (pp. 6262-6271) (**Oral**).

Tsotsos, J., Kotseruba, I., Andreopoulos, A., Wu, Y. (2019). Why does data-driven beat theory-driven computer vision?. In IEEE/CVF International Conference on Computer Vision (ICCV) Workshops.

Rasouli, A., Kotseruba, I., Tsotsos, J. K. (2018). Towards social autonomous vehicles: Understanding pedestrian-driver interactions. In IEEE International Conference on Intelligent Transportation Systems (ITSC) (pp. 729-734).

Rasouli, A., Kotseruba, I., Tsotsos, J. K. (2018). It's not all about size: On the role of data properties in pedestrian detection. In European Conference on Computer Vision (ECCV) Workshops.

Wloka, C., Kotseruba, I., Tsotsos, J. K. (2018). Active fixation control to predict saccade sequences. In IEEE Conference on Computer Vision and Pattern Recognition (CVPR) (pp. 3184-3193).

Rasouli, A., Kotseruba, I., Tsotsos, J. K. (2017). Are they going to cross? A benchmark dataset and baseline for pedestrian crosswalk behavior. In IEEE International Conference on Computer Vision (ICCV) Workshops (pp. 206-213).

Rasouli, A., Kotseruba, I., Tsotsos, J. K. (2017). Agreeing to cross: How drivers and pedestrians communicate. In IEEE Intelligent Vehicles Symposium (IV) (pp. 264-269).

Pre-prints and technical reports

*Papers marked with * are published*

* Rasouli, A., Alizadeh, S., Kotseruba, I., Ma, Y., Liang, H., Tian, Y., Huang, Z., Liu, H., Wu, J., Goebel, R., Yang, T., Taylor, M.E., Paull, L., Chen, X. (2023). Driving SMARTS Competition at NeurIPS 2022: Insights and Outcome. In NeurIPS 2022 Competition Track (pp. 73-84).

Kotseruba, I., Papagelis, M., Tsotsos, J. K. (2021). Industry and Academic Research in Computer Vision. arXiv:2107.04902.

Kotseruba, I., Tsotsos, J. K. (2021). Behavioral research and practical models of drivers' attention. arXiv:2104.05677.

* Kotseruba, I., Wloka, C., Rasouli, A., Tsotsos, J. K. (2021). Do Saliency Models Detect Odd-One-Out Targets? New Datasets and Evaluations. arXiv:2005.06583.

* Tsotsos, J. K., Kotseruba, I., Andreopoulos, A., Wu, Y. (2019). A possible reason for why data-driven beats theory-driven computer vision. arXiv:1908.10933.

* Tsotsos, J. K., Kotseruba, I., Wloka, C. (2019). Rapid Visual Categorization is not Guided by Early Salience-Based Selection. arXiv:1901.04908.

* Kotseruba, I., Tsotsos, J. K. (2018). A Review of 40 Years of Cognitive Architecture Research: Core Cognitive Abilities and Practical Applications. arXiv:1610.08602.

Wloka, C., Kunić, T., Kotseruba, I., Fahimi, R., Frosst, N., Bruce, N. D., Tsotsos, J. K. (2018). SMILER: Saliency model implementation library for experimental research. arXiv:1812.08848.

* Wloka, C., Kotseruba, I., Tsotsos, J. K. (2017). Saccade sequence prediction: Beyond static saliency maps. arXiv:1711.10959.

Kotseruba, I., Tsotsos, J. K. (2017). STAR-RT: Visual attention for real-time video game playing. arXiv:1711.09464.

* Rasouli, A., Kotseruba, I., Tsotsos, J. K. (2017). Agreeing to cross: How drivers and pedestrians communicate. arXiv: 1702.03555.

Kotseruba, I., Rasouli, A., Tsotsos, J. K. (2016). Joint attention in autonomous driving (JAAD). arXiv:1609.04741.

Presentations

** presenting author*

Invited Talks

Keynote: Kotseruba, I.*, Tsotsos, J.K.*, *40 Years of Cognitive Architectures*. AAAI Fall Symposium, Arlington, Virginia, USA, 2018.

Contributed Presentations

Poster: Kotseruba, I.*, Tsotsos J.K. SCOUT+: Towards practical task-driver drivers' gaze prediction. In IEEE Intelligent Vehicles Symposium (IV), Jeju Island, South Korea, 2024.

Poster: Kotseruba, I.*, Tsotsos J.K. Data Limitations for Modeling Top-Down Effects on Drivers' Attention. In IEEE Intelligent Vehicles Symposium (IV), Jeju Island, South Korea, 2024.

Poster: Kotseruba, I.*, Tsotsos, J. K. Understanding and Modeling the Effects of Task and Context on Drivers' Gaze Allocation. In IEEE Intelligent Vehicles Symposium (IV), Jeju Island, South Korea, 2024.

Poster: Rasouli, A.*, Kotseruba, I.* Diving Deeper Into Pedestrian Behavior Understanding: Intention Estimation, Action Prediction, and Event Risk Assessment. In IEEE Intelligent Vehicles Symposium (IV), Jeju Island, South Korea, 2024.

Oral: Kotseruba, I.*, Rasouli, A., J. K. Tsotsos, *Intend-Wait-Perceive-Cross: Exploring the Effects of Perceptual Limitations on Pedestrian Decision-Making*. Intelligent Vehicles Sypmposium (IV), Anchorage, AK, USA, 2023.

Poster: Kotseruba, I.*, Rasouli, A., J. K. Tsotsos, *Benchmark for Evaluating Pedestrian Action Prediction*. Winter Conference on Applications in Computer Vision (WACV), Virtual, 2021.

Poster: Kotseruba, I.*, Rasouli, A., J. K. Tsotsos, *Do they want to cross? Understanding pedestrian intention for behavior prediction*. Intelligent Vehicles Sypmposium (IV), Virtual, 2020.

Oral, poster: Rasouli, A.*, Kotseruba, I.*, J. K. Tsotsos, *PIE: A Large-Scale Dataset and Models for Pedestrian Intention Estimation and Trajectory Prediction*. International Conference on Computer Vision (ICCV), Seoul, South Korea, 2019.

Oral, poster: Kotseruba, I.*, Wloka, C., Rasouli, A., J. K. Tsotsos, *Do Saliency Models Detect Odd-One-Out Targets? New Datasets and Evaluations*. British Machine Vision Conference (BMVC), Cardiff, UK, 2019.

Poster: Rasouli, A.*, Kotseruba, I.*, J. K. Tsotsos, *Perception, inference, and prediction: Towards pedestrian behavior understanding*. NCRN Annual General Meeting, Queen's University, ON, Canada, 2019.

Poster: Wloka, C., Kotseruba, I.*, J. K. Tsotsos, *Active fixation control to predict saccade sequences.*. International Conference on Computer Vision and Pattern Recognition (CVPR), Salt Lake City, AZ, USA, 2017.

Poster: Rasouli, A.*, Kotseruba, I.*, J. K. Tsotsos, *Are They Going to Cross? A Benchmark Dataset and Baseline for Pedestrian Crosswalk Behavior*. Autonomous Driving Workshop at International Conference on Computer Vision, Venice, Italy, 2017.

Poster: Rasouli, A.*, Kotseruba, I.*, J. K. Tsotsos, *Understanding pedestrian behavior in complex traffic scenes*. Intelligent Vehicles Sypmposium (IV), Redondo Beach, CA, USA, 2017.

Poster: Rasouli, A.*, Kotseruba, I.*, J. K. Tsotsos, "Visual Saliency in Search and Exploration of Unknown Environments", NCFRN Annual General Meeting, Kelowna, BC, Canada, 2015

Poster: Kotseruba, I.*, J. K. Tsotsos, "Visual Attention in Dynamic Environments", Vision Sciences Society (VSS), St. Pete Beach, FL, USA, 2014.

Awards

2024	**Best Student Paper Award (3rd)**, IEEE Intelligent Vehicles Symposium	
2020–2023	**Alexander Graham Bell Doctoral Award (CGS D)**, Natural Sciences and Engineering Research Council of Canada	*$ 35,000/year*

Teaching Experience

W2024	**EECS3462 User Interfaces**, Teaching Assistant	*York University*
F2023	**EECS3401 Introduction to AI and Logical Programming**, Teaching Assistant	*York University*
W2023	**EECS3311 Software Design**, Teaching Assistant	*York University*
F2022	**EECS3401 Introduction to AI and Logical Programming**, Teaching Assistant	*York University*
W2022	**EECS2031 Sofware Tools**, Teaching Assistant	*York University*
F2020	**EECS3311 Software Design**, Teaching Assistant	*York University*
W2020	**EECS3221 Operating Systems Fundamentals**, Teaching Assistant	*York University*
F2020	**EECS3461 User Interfaces**, Teaching Assistant	*York University*
F2019	**EECS2031 Software Tools**, Teaching Assistant	*York University*
F2019	**EECS2030 Advanced Java Programming**, Teaching Assistant	*York University*
W2013	**EECS2021 Computer Organization**, Teaching Assistant	*York University*
F2013	**EECS2021 Computer Organization**, Teaching Assistant	*York University*

Professional contributions

University service

Nov, 2023	**Ad-hoc Adjudicating Committee for Tenure and Promotion**, Graduate student representative	*York University*
2022	**Lassonde Undergraduate Summer Research Conference**, Judge	*York University*
2020-2021	**Tenure and Promotion Committee**, Graduate student representative	*York University*

Workshop organization

2022	**Driving SMARTS Competition**, Organizing committee member	*NeurIPS*
2022	**Symposium on Cognitive Theories in AI**, Program committee member	*AAAI*
2022	**"All things attention" Workshop**, Program committee member	*NeurIPS*
2021	**Ontario Computer Vision Workshop (OCVW)**, Program committee member	*York University*

Grant review

European Research Council (ERC)
ETH Zurich Research Commission

Book proposal and book review

MIT Press
Springer Nature

Conference review

International Conference on Computer Vision and Pattern Recognition (CVPR) 2022-present
International Conference on Computer Vision (ICCV) 2017-present
European Conference on Computer Vision (ECCV) 2022-present
Neural Information Processing Systems (NeurIPS) 2022-present
International Conference on Robotics and Automation (ICRA) 2023-present
International Conference on Intelligent Robots (IROS) 2021-present
Intelligent Vehicles Symposium (IV) 2017-present
Winter Conference on Applications of Computer Vision (WACV) 2022-present
International Conference on Pattern Recognition (ICPR) 2022-present

Journal review

Transactions on Intelligent Transportation Systems
Artificial Intelligence Review
Robotics and Automation Letters (A-RL)
Computer Vision and Image Understanding (CVIU)
International Journal of Computer Vision (IJCV)
Journal of Field Robotics
Transportation Research Part F: Traffic Psychology and Behavior
Cognitive Processing
Frontiers in Computer Science

Professional Memberships

Sigma Xi, The Scientific Research Honor Society
IEEE
Computer Vision Foundation