Jurijs (Yuri) Nazarovs

Cupertino, CA 95014
United States

E-mail: nazarovs@wisc.edu
Phone: (919) 396-1252.
Personal Website: jurijsnazarovs.github.io
Google Scholar Profile

INDUSTRY EXPERIENCE

Amazon Alexa AI, Applied Scientist Internship May 2022 - September 2022
Proposed and implemented a novel adversarial training method to enhance the robustness of a Vision Language Model-based Question Answering system to linguistic variations and image manipulations. Authored a first-author paper on the topic.

Microsoft Research (MSR), Research Internship May 2021 - August 2021
Designed and implemented a novel Bayesian Neural Networks as cutting-edge temporal probabilistic deep learning techniques for the defense cyber domain to handle sparse, imbalanced in classes and limited in size data sets. Method is used as alarming system for human in-the-loop to detect possible ransomware. Authored a first-author publication and secured a patent.

NEC Labs America, Research Internship May 2020 - August 2020
Developed a novel triplet-based loss function and as a zero-shot framework for ordinal time series classification problems, resulting in a robust solution against missing labels. This system allows to detect time-series signals, which were not seen during training the model. Authored a first-author publication and secured a patent for the breakthrough method.

PUBLICATIONS

Functional NODE. Introduced a new Functional NODE framework which allows to sample trajectories in a VAE-like procedure, e.g. human/skeleton actions, physical processes, and other and perform statistical inference. Under submission.

Improving Robustness of VQA Models by Adversarial and Mixup Augmentation. Introduced an adversarial objective function to train the VQA (VLM), based on UNITER-like architecture with BERT component, to improve VQA robustness to linguistic variations and visual manipulations. Under submission.

Understanding Uncertainty Maps in Vision with Statistical Testing, CVPR 2022 (25% acceptance rate). Introduced Warping Neural ODE combining with Random Fields theory to derive significant regions of the Uncertainty Maps obtained from probabilistic Deep Neural Networks, like BNN/VAE in image generation and different perception settings, like segmentation.

Image2Gif: Generating Continuous Realistic Animations with Warping NODEs, CVPR 2022 (AI4CC workshop). Introduced a novel Deep learning Module, Warping Neural ODE, as a Video Frame Interpolation (VFI) mechanism, to generate GIF between two conceptually far apart frames. Method allows to generate unlimited number of FPS, making smooth VFI.

Mixed Effects Neural ODE: A variational approximation for analyzing the dynamics of panel data, UAI 2021 (26% acceptance rate). Introduced the Mixed-Effect Neural ODE model with the new ELBO-based loss, which allows to model uncertainty like SDE, but use ODE solvers in combination with DNN, for trajectory prediction of physical processes, humanoids and reconstruction of 3D brain scans of Alzheimer's disease progression.

Graph Reparameterization for enabling 1000+ Monte Carlo Iterations in Bayesian Deep Neural Networks, UAI 2021 (26% acceptance rate). Developed a new framework to construct an MC estimator for the KL term, which significantly decreases GPU memory needed to run VI version of Bayesian Neural networks and improves runtime. Memory savings allow us to run up to 1000 or more MC iterations on a single GPU.

Radial Spike and Slab Bayesian Neural Networks for Sparse Data in Ransomware Attacks, U.S. Patent.

Ordinal Quadruplet: Retrieval of Missing Labels in Ordinal Time Series, U.S. Patent.

Expanded encyclopaedias of DNA elements in the human and mouse genomes, Nature.

EDUCATION

University of Wisconsin - Madison, Madison, WI. PhD, Statistics 2016 - 2023 [April]
University of Wisconsin - Madison, Madison, WI. MS, Computer Science 2018 - 2019
Duke University, Durham, NC. MA, Economics 2014-2016
Higher School of Economics, Moscow, Russia. BS, Applied Mathematics and Computer Science 2010-2014

SKILLS

Computer Vision, Deep/Machine Learning, Multimodality, LLM, VLM, Trajectory Prediction, Probabilistic Models

Programming: Python (PyTorch, TensorFlow), R, Bash, Matlab, Java, C++