Sofia Kirsanova

Graduate CS student at the University of Minnesota

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Education

2024–present, Twin Cities, MN, USA	**Ph.D. in Computer Science**, *University of Minnesota,* *College of Science and Engineering,* *Department of Computer Science and Engineering,* *Knowledge Computing Lab,* Advisor: Dr. Yao-Yi Chiang Key words of a future PhD thesis: spatiotemporal data prediction & forecasting, natural language processing, computer vision
2019–2023, Moscow, Russia	**B.Sc. in Computer Science**, *Lomonosov Moscow State University,* *College of Computational Mathematics and Cybernetics,* *Department of Intelligent Information Technologies,* **GPA**: *3.6* Major: Computer Science and Software Engineering Thesis: Process Analytics Methods for Anomaly Detection Tasks in System Log Data

Research experience

University of Minnesota

HAYSTAC: Context-Aware Trajectory Anomaly Detection

sponsor IARPA

- Contributed to the project aimed at establishing models of "normal" human movement across time, locations, and people to detect anomalous activities
- Assisted with the design and illustration of visual aids for the paper, supporting the research in anomaly detection models
- Participated in the refinement of a context-aware approach that incorporates elements such as subject identity and nearby points-of-interest (POI) for better trajectory anomaly detection

publications
- Paper **Context-Aware Trajectory Anomaly Detection**
  Haoji Hu, Jina Kim, Jinwei Zhou, **Sofia Kirsanova**, JangHyeon Lee, and Yao-Yi Chiang
  The 32nd ACM International Conference on Advances in Geographic Information Systems (SIGSPATIAL '24).
  Atlanta, GA, USA, October 29–November 1, 2024

Critical MAAS: AI for map Geolocation and Extraction to find Critical Minerals (AIM)

sponsor DARPA

- Analyzed segmentation results from an existing model to categorize performance based on map styles and other conditions
- Manually reviewed and validated legend detection results on 100 maps, identifying maps with correct legend placement for further training and validation
- Assisted in training a model for detecting polygon legend items as part of fine-grained legend analysis
- Collaborated on long-term goals for developing models to handle more complex layouts of legend items and descriptions

Lomonosov Moscow State University

Methods for Detecting Critical Events in System Log Data

advisors Oleg Gorokhov, Mikhail Petrovsky

- Analyzed the core methods of event logs processing based on NLP techniques
- Developed preprocessing method for the raw log data based on natural texts preprocessing and detecting semantic information in logs
- Designed a CNN for detecting anomalies in clusters of log data
- Proposed a new approach of effective clustering for huge log files based on extraction sequences of events with process mining algorithms
- Achieved 98% accuracy on finding anomalies in preprocessed data and 82% within raw data

conferences
- **Detection of anomalies in system log data using process analytics methods**
  Scientific Conference "Lomonosov Readings - 2023",
  Moscow, Russia, April 4-14, 2023
- **Methods for detecting critical events in system log data**
  Scientific Conference "Tikhonov's Readings - 2022",
  Moscow, Russia, October 24-29, 2022
  IstinaResearcherID (IRID): 506655156

Evaluation and Comparison of Algorithms for the Connect6 Game with Monte Carlo Method

advisor Olga Oparina

- Conducted a benchmark analysis between several classical heuristic algorithms which are used for evaluating stochastic processes
- Measured accuracy on considered methods and state Monte Carlo method as the best for providing solitions for Connect6 game

publications
- Paper **Evaluation and Comparison of Algorithms for the Connect6 Game with Monte Carlo Method**
  Journal of the LXX Open international Student's Scientific Fair of Moscow Polytechnic University.
  Moscow, Russia, April 21-24, 2020
  ISBN: 978-5-2760-2585-8

Work Experience

Professional

Sep'23–Apr'24 **Machine Learning Researcher**, *Rotec Digital Solutions*, Moscow

Developing ML models for detecting anomalies in the operation of equipment, solving predictive maintenance problems and conducting research

Skills:
- **Frameworks** PyTorch, scikit-learn, PostgreSQL, ClickHouse
- **Platforms** MLflow, DVC, Airflow, Kedro, Prometheus, Cookiecutter, Grafana, Optuna
- **Technical skills** Docker, Git, command line, Anaconda

Apr'22–Apr'23 **Full-stack Java Developer**, *MOLNET*, Moscow

Designing web systems from scratch providing complete production cycle from servlets to interfaces.

Skills:
- **Development** Java, Spring Framework, JavaServer Pages (JSP), Maven, RESTful services/APIs, PostgreSQL
- **User interfaces** React, Bootstrap, TypeScript
- **Technical skills** Docker, Git, command line

Outreach

Jan'22–Mar'23 **Freelance Writer**, *JetBrains Academy*, Remote, freelance

An author of maths and algorithmic topics for computer science courses. Areas: probability theory, statistics, data structures, algorithms

Honors & Awards

Hackathons & challenges TV NeuroTech hackathon. 1st prize

- **Case**: to find, formalize and explore the statistical validity of the dependencies of indicators of the quality of life of the population (income, demography, credit burden, etc.) on the indicators of state resource provision.
- **Data**: official statistics of the Russian Federation for the last 10-15 years.
- My task was to detect and clean outliers in the data.

Volunteering

Mentor in an online school at *Academy of mentors*

Spring'21 Helped professors and managed webinars and online meetings during teacher courses

Admissions officer at *Lomonosov Moscow State University*

Summer'20 Processed documents for the department and consulted on admission issues