David Novikov

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EDUCATION

The Ohio State University, Columbus, OH
B.S. in Computer Science and Engineering   **Aug 2019 - present**
- Honors Research Distinction: Geolocalization of objects from drone footage
- GPA: 4.0
- Minor: Russian Language and Culture

Cleveland State University, Cleveland, OH
Duel enrollment during high school - Physics   **Jan 2018 - May 2019**
- GPA: 4.0

Cuyahoga Community College, Cleveland, OH
Duel enrollment during high school - Music   **Aug 2015 - Dec 2018**
- GPA: 4.0

RESEARCH EXPERIENCE

Scaling up Drone Detection using Synthetic Data
Advisor: Professor Mubarak Shah   **May - Sept 2022**
- Submitted to ICRA 2023
- Beat SOTA by 0.03 mAP@50 and 0.05 mAP@50 while improving inference speed by 176.19% and 140.74% for the FL and NPS drone datasets respectively
- Generated synthetic data images with stable-diffusion model
- Experimented with 39 synthetic data generation configurations
- Wrote scripts that generated training scripts and required files to reduce training time

Car Detection and Localization from Drones
Advisor: Professor Alper Yilmaz   **March 2022 - Present**
- Honors Undergraduate Research Thesis
- Annotated dataset for car detection tasks from drone footage
- Trained computer vision model to detect cars with sliced window inference
- Geo-localizing cars from drone footage

Stroke Detection using Body Tracking
Advisor: Professor Alper Yilmaz   **May 2021 – March 2022**
- Developed stroke detection algorithms to determine stroke severity using body tracking, facial analysis, and patient's answers to verbal questions
- Lead switch to MediaPipe library to enable faster development and testing

PUBLICATIONS AND MANUSCRIPTS

Scaling up Drone Detection using Synthetic Data preprint
David Novikov, Rohit Gupta, Mubarak Shah
submitted to IEEE International Conference on Robotics and Automation (ICRA) 2023

SKILLS

Software: Python, C, C++, Matlab, SQLite, C#, Dart/Flutter, lua, x86-64 ASM, STM8 ASM, Java, LaTeX, Git, opencv, MediaPipe, pandas, Pytorch, Tensorflow, NumPy, Linux, .NET framework, JSON, Make, gdb, SolidWorks
Relevant courses: Intro AI, Linear Algebra, Foundations of Higher Math, Statistics, Machine Learning (in progress), Computer Vision (in progress), Software Development

and Design, Discrete Structures, Data Structures and Algorithms, Low Level Programming and Computer Organization, Operating Systems, Interactive Systems, Intro Databases systems, Intro Computer Networking,
Languages: Russian (fluent), Hebrew (proficient)

WORK EXPERIENCE	**General Electric Appliances**

WORK EXPERIENCE

General Electric Appliances
Software Engineering Co-op, *Louisville, KY*   **May – Aug 2021**
- Completed 2 initial patent disclosures to diagnose dishwasher faults by aggregating data from multiple sensors
- Expanded advanced water level monitoring system for dishwashers to address exceptional fill and drain malfunctions
- Developed device drivers during microchip shortage to transition to new embedded microchips
- Automated materials tracking tasks in factory, reduced time to track materials from 1 hour to 5 seconds

General Electric Appliances
Software Engineering Co-op, *remote*   **Aug - Dec 2020**
- Developed User Interface and backend for Wall Oven LCD screen using Dart/Flutter
- Generated tests to monitor code test coverage using lcov for line coverage and automated UI tests for functionality

Cleveland State University
Physics Teaching Assistant *Cleveland, OH*   **Jan - May 2019**
- Led lab portion of Honors Introduction to Calculus-based Mechanics
- Lectured on and wrote tutorials for applying statistical analysis to lab results to determine experimental error thresholds
- Wrote and conducted new physics labs for science teachers in Cleveland schools

ACADEMIC / EXTRACURRICULAR PROJECTS

OSU Hackathon 2022 – De-distracted Driving
1st place of 75 overall, 2nd place of 25 in Honda Contest   **Oct 2022**
- Sourced and automated the annotation of 13,037 images for distracted driving to train computer vision model to detect distracted driving
- Integrated yolov5 model, Arduino, and webcam to detect distracted drivers and alert them using lights and buzzers in real-time

Ohio State Mathematical Contest in Modeling
1st place of 6   **Nov 2022**
- Modeled Urban Heat Island effect in Durham and how improvements in green spaces will decrease redux heat in the city
- Wrote report recommending where to target green space improvement and provided strategies to optimize the limited budget for redux heat reduction

Directed Reading Program
Area of Study: Matroids   **Sept - Dec 2021**
- Read *Matroids: A Geometric Introduction* and discussed proofs. Presented on matroids to mathematics graduate students.

LEADERSHIP AND INVOLVEMENT

The Ohio State Autodrive Challenge
Perception team   **Sept 2022 - Present**
- Developing effective data transfer between vision models and control systems for autonomous vehicle navigation
- Diagnosing and accelerating computationally demanding processes to ensure timely object detection and tracking

The Ohio State Society of Women Engineers

HeForSWE Affinity Chair   **Nov 2020 - Present**
- Pilot program lead for male affinity group focusing on facilitating positive and effective allyship towards women and other historically marginalized minorities in engineering

- Volunteering in engineering outreach events to educate and promote Science Technology Engineering and Mathematics for K-12 students

The Ohio State Unicycle Club

Vice President   **Aug 2019 - Present**
- Encouraging and promoting unicycling within The Ohio State community

The Ohio State Hometown Ambassadors

Team Lead   **Jan 2021**
- Organized presentation with engineering students for alma mater high school to promote and inform students on the opportunities available to them

Cleveland State Society of Physics Students

Fabulous Physics Question Writer   **August 2018 - May 2019**
- Presented and discussed physics-style riddles to students interested in physics

HONORS AND ACCOLADES

Ohio State University
Undergraduate Research Scholarship, *Columbus, OH*   **August 2022 - May 2023**
Ohio State University
Provost Scholarship, *Columbus, OH*   **August 2019 - May 2023**
Cleveland State University
Undergraduate Teaching Assistant of the Year Award, *Cleveland, OH*   **2018-2019**