Shalev Lifshitz | AI Researcher & Engineer lifshitz.shalev@gmail.com | shalev.ca | LinkedIn | GitHub

Education

University of Toronto, Bachelors – GPA: 3.92 **September 2020 – May 2024**
Computer Science Specialist, Mathematics Minor

Skills

- **Languages:** Python, C/C++, Java, JavaScript, C#
- **AI:** PyTorch, Tensorflow, OpenCV, NumPy, OpenAI Gym, ONNX, NVIDIA Isaac Sim, NVIDIA Apex, Scikit-Learn
- **Web:** Django, ReactJS, Node.js, Java Spring, PostgreSQL
- **General:** Git, Docker, Linux, Matplotlib, Pandas, SciPy, NVIDIA Omniverse
- **Software Design**: CLEAN Architecture, SOLID Principles, Design Patterns, Regression Testing, Database Design

Experience

Vector Institute, University of Toronto – generalist text-to-behavior AI agents **January 2022 – Present**
AI Researcher

- **Published Research Paper (First-Author, NeurIPS 2023 Spotlight):**
  - *STEVE-1: A Generative Model for Text-to-Behavior in Minecraft*
  - https://arxiv.org/pdf/2306.00937.pdf
- Under Prof. Sheila McIlraith, created STEVE-1, a multi-modal instruction-following agent in Minecraft that can accept any piece of text as an instruction and take actions using low-level keyboard/mouse controls.
- We introduced a recipe for instruction-tuning foundation models of behavior in a scalable, self-supervised way.
- Now, I'm working on new projects around the creation of generalist agents and new types of LLMs.

Presagis – AI for Digital Twin generation & to detect the cause of car accidents **May 2022 – August 2022**
Deep Reinforcement Learning (RL) Engineer

- Designed a method to determine the cause of car accidents using RL and 3D Digital Twin simulations of cities.
- Built a city traffic simulation using NVIDIA Isaac Sim to predict the cause of car accidents.
- Trained RL algorithms for autonomous driving and autonomous drone control using AirSim.
- With Innovation team, designed a pipeline for automatically generating 3D Digital Twins of cities from photos.
- Spoke with customers and helped them discover how RL and 3D Digital Twins can advance their business.

Claronav – algorithms to automatically understand CT scans **January 2020 – August 2021**
Machine Learning Engineer

- Designed and built the entire Machine Learning infrastructure from the ground up and created multiple Deep Learning models (both 2D & 3D input) to automate surgical navigation planning.
- Combined CNNs and Fully Convolutional Networks with classical computer vision methods to segment and detect object presence and shape in CT scans.
- Deployed the models using ONNX library in hundreds of surgical navigation units worldwide and built infrastructure to analyze training results for quick iteration of model architectures.

Kimia Lab, University of Waterloo – histopathology image search for cancer diagnosis **May 2019 – January 2020**
AI Researcher

- **Research Paper (First-Author):** *Gram Barcodes for Histopathology Tissue Texture Retrieval*
  - https://arxiv.org/abs/2111.15519
- Created and tested a novel histopathology image search algorithm to help pathologists diagnose cancer.
- Achieved highly competitive accuracy levels and, for some datasets, achieved state of the art results.

Kimia Lab, University of Waterloo – a new type of neural network **September 2018 – March 2019**
AI Researcher

- **Research Paper (Co-Author):** *Subtractive Perceptrons for Learning Images: A Preliminary Report*
  - https://arxiv.org/abs/1909.12933
- Proposed a novel, brain-inspired neural network as an alternative to the current feed-forward approach.

- Achieved excellent results compared to feed-forward networks with more complex topologies.
- Created the novel architecture from scratch since our unique experiments could not run with existing libraries.
- Implemented a novel non-gradient-based learning algorithm from scratch.

SickKids AI Research – computer vision for faster and better diagnosis **June 2018 – August 2018**

AI Researcher

- Researched ML & Computer Vision techniques to diagnose genetic disorders from cell images.

Projects (Web Dev & C++)

Toronto Fitness Club – full-stack Fitness Club website **Fall 2022**

- Built a full-stack website for a fictitious Fitness Club using Django and ReactJS.
- Worked in a team of 2 as part of a Web Programming course at the University of Toronto.

3D Rendering Engine – rasterization engine from scratch in C++ **Winter 2022**

- Built a graphics rendering engine (rasterizer) from scratch in C++, without the use of graphics libraries such as OpenGL or DirectX: https://github.com/render-farm/psr-3d-rendering-engine
- Built a custom entity component system to manage in-game objects and optimized core rendering algorithms.

AutoDirect – website to help users find cars with customized, pre-approved loans **Fall 2021**

- Architected and built entire backend with Java Spring and PostgreSQL: https://github.com/TLI-Group-1/Backend
- Implemented regression testing infrastructure for the backend codebase using GitHub actions.
- Worked in a team of 3 and collaborated with a Toronto-based StartUp that provided the loan pre-approval API.

Awards & Achievements

- C. David Naylor Scholarship from the University of Toronto ($20 000)
- Winning Pitch at the McMaster University Fall 2018 Innovation Sprint
- Best Startup at SAGE Canada

Speaking Engagements

12 speaking engagements at multiple international conferences.

- Visit shalev.ca/talks for a more complete list.
- Some select speaking engagements:
    - Talk at SXSW 2023 (Austin, Texas)
    - Talk at IFA (Berlin, Germany)
    - Panel at FiRe: Future in Review (San Diego, United States)
    - Interview with Into Tomorrow (Berlin, Germany)