Elijah Soba

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EDUCATION

University of Michigan Ann Arbor: College of Engineering **Sep 2017 - Apr 2022**
Bachelor of Science in Biomedical Engineering *Cumulative GPA: **3.7/4.0***
Masters** in **Signal & Image Processing** and **Machine Learning *Major GPA: **3.9/4.0***
Certifications: Deloitte AI Academy, AWS Cloud Practitioner, Agile
Organizations: Society of Hispanic Engineers (**SHPE**), Google CS Research Mentorship Program '21
Awards: Deans List (2017-2021), James B Angel Scholar

SKILLS

Programming Languages:	**Python, C++**, **Julia**, **SQL**, **MATLAB**, Scala, HTML, CSS, Git,
Machine Learning Packages:	**Pytorch**, **HuggingFace, Tensorflow, LangChain**, **JAX**, Scikit-Learn, Pandas, NumPy
Cloud Computing/Big Data:	**AWS**, **Google Cloud**, **Docker**, **Kubeflow**, Kubernetes, Apache Spark, Elasticsearch

PUBLICATIONS

Foundational Models for Malware Embeddings Using Spatio-Temporal Parallel Convolutional Networks, **ICNC'24**
Exploration of Open **Large Language Models** for E-discovery, **NLLP'23** (co-located with **EMNLP**)
Modeling Deep Reinforcement Learning Agents in Simulated Financial Markets, **ICAIF'22**

WORK EXPERIENCE

Data Scientist 1: Hallucination Detection *Dec 2023 – Present*
Deloitte AI Center of Excellence

- **Leading research efforts** to investigate detection of non-factual information output by **Generative AI models**
- Designed a **novel** algorithm implemented in **PyTorch** that uses **word embeddings**, **gradient flipping** and **LLM** extracted **cross attention** to classify source & generated claim pairs as hallucinations with **85%** balanced accuracy.
- **Presenting** weekly **updates** to **technical/non-technical stakeholders** to **explain results, progress and next steps**

Data Scientist 1: Large Language Models for E-Discovery *May 2023 – Dec 2023*
Deloitte AI Center of Excellence

- Created pipeline for **fine-tuning LLaMa 13B** using **LoRA, QLoRA** and **instruction tuning** on legal documents
- Developed **topic classification algorithm** using **LLMs** with **LangChain** and **OpenAI** to aid e-discovery research
- Designed a **LLM chatbot** with **automatic document retrieval** to reduce conflict of interest detection time by 70%
- Worked with platform team to **deploy demos** of functionality on **production servers** using **Streamlit** and **Docker**

Data Scientist 1: Cyber Security Anomaly Detection *Sep 2022 – April 2023*
Deloitte AI Center of Excellence

- Created pipeline to ingest raw network flow data using **Kubeflow, Pytorch, NetworkX**, and **Elasticsearch**
- Enhanced architecture of **anomaly detectors** by introducing **graph embeddings, CNNs** and **metric learning**
- Leveraged **state of the art NLP** models to explore **multimodal graph** and **text embeddings** for malware detection
- Designed **real-time inference demos** using **Kibana** to demonstrate efficacy of **model detection** on malware strains

Machine Learning Research Assistant: Stability of Non-Adaptive Trading in CDA *May 2021 – May 2022*
University of Michigan College of Engineering

- Developed **reinforcement learning** agents in **TensorFlow** to pick optimal parameters for buying/selling securities
- Explored tradeoffs between **algorithms** to determine how **reward signals** impact performance and stability
- Conducted **hyperparameter sweep** on **GPU** supported **supercomputer** cluster to **optimize** discrete agent actions
- Presented at poster seminar to discuss results and practical implementation details with the broader research group

Stryker Fellowship: Smart Recognition of Neurosurgical Tool Attachments *May 2020 – Dec 2020*
***Computer Vision** Project*

- Developed algorithm for **multi-class image recognition** of neurosurgical tools using **OpenCV**, and **Keras**
- Trained **transfer learning** model on single **GPU** to achieve **95% test accuracy** and **50% faster inference** time
- Create **Python GUI** on top of **pre-trained model** to **present** results and capabilities at yearly design conference