Ryan David Melzer

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Education

The University of Arizona, Tucson AZ
- M.S. in Computer Science, emphasis in Machine Learning. **Expected graduation**: December 2020 (4.0/4.0 GPA)
- B.S. in Computer Science, B.S. in Mathematics, May 2017 (4.0/4.0 major GPA)

Experience

Research Intern - Sandia National Laboratories. Albuquerque, NM   **Summer 2019, Summer 2020, Fall 2020**
- Implemented a wide variety of deep neural network models for target recognition and pose estimation in synthetic aperture radar imagery to run on autonomous aircraft, several of which exceeded current state-of-the-art accuracy by several percentage points.
- Implemented explainability algorithms for these models and discovered that many of them make classification decisions based on unexpected features in the imagery.
- Real, usable data is difficult to obtain in this domain. Developed deep neural network models and utilized neural architecture search for domain adaptation between simulated and real radar imagery in order to mitigate this issue.
- Skills and technologies used: Python, PyTorch, C++, computer vision, OpenCV, scikit-learn, deep learning.

Graduate Research Assistant - University of Arizona Department of Computer Science. Tucson, AZ   **Jan 2019 -**
- Implemented and successfully trained deep reinforcement learning algorithms for control of a hypersonic aircraft.
- Developed and implemented an unsupervised learning algorithm for real-time outlier detection in streaming astronomical data from a large, high throughput telescope.
- Skills and technologies used: Python, PyTorch, scikit-learn, machine learning, deep reinforcement learning.

Software Engineer I - Optiver. Chicago, IL   **Jun 2017 - Apr 2018**
- Built and launched a real-time post-trade analysis tool to analyze the behavior of a new automated trading strategy. This tool allowed the company to test and deploy the strategy at scale safely.
- Implemented and deployed an ultra-fast high-frequency trading application on an unsupported exchange. Extended an in-house end-to-end testing framework to cover both the new application and the exchange.
- Discovered a use-case for a new microsecond time-scale trading strategy through examining individual packets sent over an exchanges' UDP broadcast. Implemented, tested, and deployed this strategy in an existing trading application.
- Implemented, tested, and deployed a safety mechanism across the entire trading system to prevent automated trades outside of algorithmically predetermined price limits.
- Skills and technologies used: C++, C#, Unix, Python, Java, high frequency trading.

Software Engineering Intern - Optiver. Chicago, IL   **Summer 2016**
- Built a server to simulate changes in option prices using forecasted market fluctuations and changes in pricing model parameters. This server computed large matrix operations in parallel for thousands of options and broadcasted the results on a local UDP network.
- Developed and deployed server that collected real-time monitoring statistics of work queues in the data collection system. The server was able to easily identify bottlenecks across each component of the system in real-time.
- Skills and technologies used: C#, Python.

Software Engineering Intern - Rincon Research Corporation. Tucson, AZ   **Summer 2015**
- Developed and deployed a geolocation algorithm used onboard autonomous drone clusters.
- Skills and technologies used: C++, Python, Unix.

Teaching Assistant - University of Arizona Department of Computer Science. Tucson, AZ   **2015, 2016, 2018**

Interests
- Lead guitarist, founding member, and composer for a regionally successful band. Produced multiple records and performed across the southwestern United States.
- Independent electronic music producer.