Marcin Rutkowski

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SKILLS

C++ (17, 20) , Python, C#, Computer Vision, Robotics, LiDAR
Linux (Debian/Ubuntu/L4T/RT), Nvidia Jetson, Fieldbus, Networking. MCUs

EXPERIENCE

Senior Staff Software Engineer - ShieldAI (Dallas, TX) 2022 - Apr 2024

- Enabling HiveMind AI suite integration with the V-BAT UAV.
- Designing, implementing system health management across vehicles and infrastructure.
- Re-architected and ported legacy avionics to a new distributed microcontroller platform.
- Proposed and prototyped a novel localization system to assist in short to medium range vehicle positioning for precision landing.
- Evaluated vision and AI platforms optimized for large area search missions.
- Provided prototyping embedded software support for SWaP optimized IC development.

Lead Software Engineer -Advanced Robotics Group (Houston, TX) 2020 - 2022

- Led the development of a patented product in the area of autonomous robotics.
- Product architecture and implementation responsibilities:
    - Architecting and implementing multi-processing system architecture
    - Developing real time algorithms processing over 400 MB/sec in multiple data streams for: image processing, localization, robust sensor fusion
    - Developing custom Linux kernel to increase throughput and reduce latency
    - Optimizing non preemptive kernel for reliable operation of real time protocols
- Technical team responsibilities:
    - Developing project plans, deliverables, and estimates, setting up and executing hiring process and mentoring junior engineers, finding external contractors and delegating tasks to them.
    - Established the CICD pipeline and defined the development process

Embedded Software Engineer - The Marsden Group, acq. by Microsoft (Houston, TX) 2019 - 2020

- Redesigned the product to achieve latency and throughput requirements. Critical improvements:
    - Invented a novel **LiDAR point cloud** processing algorithm - 500x computational time improvement over the original proof of concept implementation, superior to commercially available libraries.
    - Improved the deep neural network inference in **image recognition** to perform 4x faster at reduced power consumption without any loss in precision. Critical improvement to meet operational requirements.
    - Optimized architecture for latency - **linux kernel / tcp stack / application layer** - achieved 20x latency reduction
- Implemented and optimized computer vision solutions using **Convolutional Neural Networks** using **Nvidia Jetson TX2 and Xavier AGX** platforms.
- Improved **backend infrastructure**- built data transmission application for device and server with dynamic network load handling and automatic device discovery;
- Link to project description available at *rutkow.ski*

Embedded IIoT Software Engineer - SLIIC, Schlumberger (Houston, TX) 2014 – 2019

- Developed a fully automated industrial power pack consisting of a diesel engine providing electric and hydraulic power to connected devices.
- Ensured robustness and stability for continued multi-week operations controlling critical safety infrastructure that prevents catastrophic incidents with multi-million loss and fatalities potential.
- Set up connectivity and integration API to control the system through local handheld devices, local server, cloud server.
- Defined the hardware stack and the unit architecture, developed all software running on the unit, built HIL and SIL systems and used combinations of them to validate fail safety, operations at scale, swapping, modular deployment, etc.
- Awarded a Top 5 New Technology Project out of 300 submissions across all worldwide incorporated entities.
- Forward Deployed Engineer:
    - Managed operations and logistics of the latest technology releases in Saudi Arabia acting as a technical engineer in charge of a team of 10 performing operations in the world's most demanding environment.
- Links to project descriptions available at *rutkow.ski*

Research Assistant - The University of Oklahoma (Norman, OK)

- **Translational Medicine Research Office** (OU Health Sciences Center) 2011 – 2014
    - Created a prototype of a multiprocessing system for high speed evaluation of sensory data to assist in the training of newborn handling.
- **Civil Engineering Lab** 2013 – 2014
    - Created a data acquisition system for analysis of soil compaction; sensor measurements included load pressure, soil displacement, soil pressure on the walls and geogrid strain.
- **Telecommunications and Interoperability Lab** Summer 2012
    - Co-authored "Compression of Distributed Correlated Temperature Data in Sensor Networks" IEEE 2013 (*https://ieeexplore.ieee.org/document/6543089/*)
- **Graphic Information Systems Lab** 2011 – 2012
    - NASA sponsored image processing project: Created map products and interpreted geospatial data layers; processed terabytes of satellite data.
    - Research published (*https://doi.org/10.1080/1747423X.2013.798038*)

Staff Photographer and Photo Desk Editor, Oklahoma Daily (Norman, OK) 2009 - 2012

- Awarded Photograph of the Year (2010).

EDUCATION

M.S. Electrical and Computer Engineering, The University of Oklahoma May 2014

- GPA: 3.8/4.0

B.Sc. Computer Engineering, The University of Oklahoma (with Distinction) May 2013

- Dean's List, President's Honor Roll (2011, 2013)
- Davis Scholarship, OU Scholar Status: Full scholarship (2009-2013)
- Charles & Jean Smith Scholarship: for a leader believed to make an impact on society (2010-2011)