Cody G. Feltch

Freelance Software Engineer & Data Scientist

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Summary

Software Engineer with an M.S. in Electrical and Computer Engineering, and experience in software design and development. Proficient in a variety of technology areas, including full-stack development, embedded systems, data collection systems, signal processing, machine learning and brain-computer interfaces. Experienced system architect and leader of small multi-disciplinary engineering teams.

Experience

Tanzen Medical

Baltimore, MD

Chief Technology Officer — *Sept. 2018 - Present*

- Invented an affordable, clinically accurate, sleep assessment device using a unique sensing solution; fusing inertial and capacitive measures.
- Trained novel machine learners on leg movement data, to identify biomarkers of sleep disorder and disease.
- Lead the development of a wearable device, mobile application, web applications, SQL/NoSQL storage solutions and AWS integrations.
- Defined business models, built customer relationships and managed a team of talented engineers and scientists.

University of Maryland Baltimore County

Baltimore, MD

Software Engineering Contractor — *July 2020 - Present*

- Developed the CyMOT Learning Management System (LMS) for hosting manufacturing related cybersecurity courseware.
- Created an implementation of the Moodle open-source LMS, with custom front-end and analytic plugins; hosted on AWS.
- Worked with MxD to develop a system for competency-based learning and progress tracking, based off of a cybersecurity skills taxonomy.

DCS Corp / Army Research Lab

Aberdeen Proving Grounds, MD

Software Engineer (Research Support for ARL Human Research & Engineering) — *Oct. 2014 - Sept. 2018*

- Collaborated with a multi-disciplinary team of scientists to design and implement data collection systems for psycho-physiology experiments.
- Developed desktop and mobile applications for user interaction, experiment control, tagging and data storage.
- Built a suite of Android apps and services for the logging, visualization and networking of data from Bluetooth sensors.
- Created and implemented data communication schemas for IP and Bluetooth communication.
- Wrote data preparation, exploration and analysis code for physiology data and experimental events, in Python and MATLAB.
- Developed a Python based testbed for real-time data analysis and visualization prototyping.
- Created VR applications with Unity and SteamVR, including an interactive 3D brain displaying oscillatory activity from real-time EEG data.
- Designed custom sensing systems, including a posture sensor using an Arduino and arrays of force sensitive resistors.

Raytheon SAS

Aberdeen Proving Grounds, MD

Systems Software Engineer for Identification Friend or Foe (IFF) Systems — *Spring/Fall 2012, Aug. 2013 - Oct. 2014*

- Responsible for the development of system requirements, diagrams, and test set software for Identification Friend or Foe (IFF) systems.
- Wrote C based test set software to interface with GPIB and RS-232 devices, for instrument control.
- Automated production testing for cost savings and to limit error from manual interaction.
- Modeled requirement in Rational Rhapsody for specifications and code generation.

Skills

Technology	Software Arcitechture, Database Design, Data Comms & Networking, Full-Stack Dev, Machine Learning, Signal Processing
Languages	Python, C, C++, Java, JavaScript, C#, MATLAB
Front End	Vue, HTML/CSS/JS, Bootstrap, EJS, Plotly
Back End	NodeJS, Express, MongoDB, InfluxDB, AWS (EC2), Flask, NGINX, SQL
Other	Android, Unity, SteamVR, OpenCV, scikit-learn, Anaconda, Git, SVN

Education

Johns Hopkins University (Engineering for Professionals Program)

Elkridge, MD

M.S. in Computer and Electrical Engineering (Honors) — *Part-Time, 2014-2017*

- Studied Computer Science concepts, Machine Learning, Robotic Manipulation, Computer Vision and DSP.

York College of Pennsylvania

York, PA

B.S. in Electrical Engineering (Magna Cum Laude) — *2009 - 2013*

- Specialized in Digital and Analog Communication Systems, Radar Design and Control Theory.

Grants

NSF SBIR Phase I *Project ID: 1819626*

In-home Monitoring of Sleep Fragmentation and Micro-Arousals by Characterizing Leg Movements *2018-2020*

- Principal Investigator (PI) for a $225k NSF grant focused on developing a novel sensing technology and analysis methods for monitoring leg movement data during sleep, and extraction of clinically relevant sleep metrics and bio-markers of disorder.

Publications

Automatic Nighttime Agitation and Sleep Disruption Detection Using a Wearable Ankle Device and Machine Learning *Sleep, Volume 43*

R Kumar, C Feltch, K Richards, J Morrison, A Rangel, R Janney, S Shayesteh, R Allen, N Banerjee *May 27, 2020*

- Product of a collaboration with the University of Texas Austin, studying nighttime behavior in patients with Alzheimer's disease (AD) and applicability of automated detection of agitation behaviour.

Pilot study: Can machine learning analyses of movement discriminate between leg movements in sleep (LMS) with vs. without cortical arousals? *Sleep Breath (2020)*

A Jha, N Banerjee, C Feltch, et al. *May 26, 2020*

- Article detailing the preliminary research into a supervised learning approach for categorizing leg movements during sleep (LMS) associated with cortical micro-arousals, based on inertial and capacitive sensing data.