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Education

University of Alabama

Tuscaloosa, AL

M.S. in Computer Science, Focus: Machine Learning

August 2019 – May 2020

B.S. in Computer Science, Minor in German

August 2016 – May 2019

Thomas Jefferson High School for Science and Technology (TJHSST)

Alexandria, VA

Computer Science Program

August 2012 - June 2016

Publications

1. **P. Stegman**, C. S. Crawford, M. Andujar, A. Nijholt and J. E. Gilbert, "**Brain–Computer Interface Software: A Review and Discussion**," in IEEE Transactions on Human-Machine Systems, vol. 50, no. 2, pp. 101-115, April 2020.
2. **P. Stegman**, C. Crawford, and J. Gray, "**WebBCI: An Electroencephalography Toolkit Built on Modern Web Technologies**," in Augmented Cognition: Intelligent Technologies, 2018, pp. 212–221.
3. A. Holloman, W. Egbert, **P. Stegman**, N. Cioli, and C. S. Crawford, "**Leveraging Neurophysiological Information to Augment Interpretation of Responses to Vulnerable Robot Behaviors**," in 2019 14th ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2019, pp. 566–567.

Experience

Yext | Data Scientist

September 2020 – Present

- Implemented a reinforcement learning model to rerank search results in real time through incremental A/B tests. Improved click-through rate on 43% of search results. Technologies used: Java, Bazel.
- Trained a feed-forward neural network to rerank search results based on user interaction data. This increased first-result click through by 8.6%. Technologies used: Pandas, NumPy, and TensorFlow.
- Trained a large GPT-3-like model for few-shot natural language processing (NLP) tasks. Vetted hardware vendors, determined appropriate cost/performance tradeoffs, and researched ideal usage conditions.
- Created a Vue.js web app for visualizing BERT self attention. Designed a method to reduce BERT attention matrices to a summary matrix. Served model via a Flask REST API containerized with Docker.
- Wrote department-wide guidelines for modular system architecture design, ensuring all code followed the same set of standards for easier collaboration and better maintainability.

Neuroosity | Data Scientist, Contractor

October 2019 - September 2020

- Implemented state-of-the-art machine learning and signal processing methods in TypeScript, allowing for client-side data processing. This resulted in high levels of data privacy, a key value for Neuroosity.
- Designed a Visual Studio Code extension in TypeScript which collected user brainwave data via a Neuroosity EEG headset. The extension periodically prompted users to rate their productivity. This allowed us to research the associations between brainwaves and productivity.
- Maintained a React-powered dashboard for EEG signal and neuro metric visualization.
- Improved motor imagery classification accuracy by combining convolutional and recurrent networks. Used TensorFlow for data preprocessing, neural network design, training, and evaluation.

Nolij Consulting | Software Engineer, Part-Time

April 2015 – April 2020

- Developed an Angular application for the U.S. Dept. of Health and Human Services (HHS) to search through and filter contracts for health supplies.
- Developed a data-labeling web app for machine learning research within HHS.
- Updated General Services Administration (GSA) documentation website backend, improved page load time by 50%.
- Created a web app for WYSIWYG editing of custom file formats used for documentation. This allowed the company to hire a technical writer to improve the documentation.
- Created and maintained the company website, mail servers, and various internal tools used to improve employee workflows.

University of Alabama

Human-Technology Interaction Lab | Research Assistant

August 2017 - May 2020

- Created a widely used JavaScript library for interacting with brain-computer interfaces and processing the incoming brainwave data in real time. GitHub repo: github.com/pwstegman/bci.js.
- Implemented 30+ mathematical methods and algorithms for brainwave processing (bandpower, periodograms, independent component analysis, common spatial pattern, etc.).
- Conducted EEG signal processing research using TensorFlow.

Mercedes-Benz U.S. International (MBUSI) | Researcher

January 2019 - April 2019

- Conducted Microsoft Kinect gesture recognition research as part of a partnership between The University of Alabama and MBUSI.
- Designed gesture-based device control for use in factory environments.
- MBUSI reported that the final system exceeded project expectations and was more accurate and easier to use than prior systems.

University of Alabama

Laboratory for Immersive Communication | Research Assistant

May 2017 - August 2017

- Created MATLAB scripts to analyze assorted video encoding methods.
- Performed statistical analysis on compressed data to develop a more efficient video encoding method.

Subtoshi Cryptocurrency Exchange | Full Stack Developer

May 2014 - December 2014

- Self-made and run business.
- Designed entire system architecture, including systems administration, database design, backend API design, front-end implementation, and hot/cold wallet security infrastructure. Technologies used: HTML + CSS + JS, PHP, MySQL.

Skills

Languages: Python, Java, HTML + CSS, JavaScript, TypeScript, C, C++, PHP, SQL, MATLAB

Specializations: Brain-computer interfaces, deep learning, reinforcement learning, signal processing

Projects

1. **BCI.js:** A JavaScript library for brain-computer interface signal processing and ML methods. Languages used: JavaScript. GitHub repo: <https://github.com/pwstegman/bci.js>.
2. **SpaceBowl:** A virtual reality (VR) bowling game that used electromyography (EMG) signals from a Thalmic Labs Myo to create an immersive VR bowling experience. Languages used: C#. GitHub repo: <https://github.com/pwstegman/SpaceBowl>.
3. **TOS-AI:** A bag-of-words based classifier that extracts important sentences from a website's terms of service (TOS). Languages used: HTML, CSS, JavaScript, PHP. GitHub repo: <https://github.com/pwstegman/TOS-AI>.