Joshua Aney

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Research & Technical Projects

SEEG (Stereoelectroencephalography) Signal Analysis Research

Skills Used: MATLAB, Signal Analysis, Data Preprocessing, Feature Extraction, Linear Algebra, Adobe Illustrator, Technical Writing

- Conducted algorithmic analysis on human SEEG data to study how the brain responds to auditory stimuli.
- Implemented signal processing pipelines including noise reduction, baseline correction, artifact rejection.
- Used Canonical Response Parameterization for feature extraction.
- Worked with a multidisciplinary team in the CaMP (Cybernetics and Motor Physiology) Lab at Mayo Clinic, Rochester, MN to integrate findings and refine experimental protocols for SEEG analysis.

Machine Learning Models from Scratch

Skills Used: Python, NumPy, Matplotlib, UML, Technical Writing, Linear Algebra, Algorithm Design, Data Preprocessing, Object-Oriented Programming

- Worked as a team in an undergraduate class to code the following without any Machine learning libraries
    - Naïve Bayes Classification Model
    - K-Nearest Neighbors classification and regression model with an edited K-Nearest Neighbors implementation.
    - K-Means and DBSCAN clustering models
    - Densely Connected Neural network with an arbitrary number of hidden layers and nodes that used backpropagation, the genetic algorithm, and particle swarm optimization, and differential evolution as the training methods.
- Created a thorough design document explaining the structure and timeline of each experiment.
- Wrote a technical writeup explaining the purpose, datasets used, methods, and results of each experiment.

Bozeman Bike Trails Application

Skills Used: C#, HTML, CSS, Razor Pages, .NET Core, Mapbox, SQL Server, Entity Framework Core, User Authentication

- Developed a personal web application that tracks the bike trail GPS information from the trail the user has ridden.
- Integrated user authentication with .NET Core Identity for secure user access.
- Parse uploaded GPX files and store them in a relational database using Entity Framework Core.
- Rendered interactive 3D trail maps using Mapbox GL.
- Implemented filtering and search functionality to organize and display user's trails based on certain attributes or descriptors.

Employment

- Undergraduate Research Intern: Mayo Clinic (Summers 2024, 2025), Rochester, MN
- Tennis Coach / Desk Assistant: Bobcat Anderson Tennis Center (Academic Years 2023 - Current), Bozeman, MT
- Tennis Coach / Desk Assistant: Rochester Tennis Connection (Summers 2018 – Current), Rochester, MN
- Retail Associate: Tyrol Ski and Sports (Winters 2020 – Current), Rochester, MN

Education

Montana State University (Expected Graduation May 2026)

- Major: BS Computer Science (Fourth year, GPA: 3.95)
- President's List Spring 2023/Fall 2023/Spring 2024/Spring 2025 (4.0), Dean's List Fall 2022/Fall 2024 (3.5+)

Relevant Coursework

- Languages : Java, C, Python, SQL, UML
- Environments: Windows, Linux Server, Terminal, GitHub
- Software Design: Data Structures and Algorithms, Discrete Structures, Machine Learning, Linear Algebra Technical Writing and Communication

Extracurricular Activities and Leadership

Co-president of the Montana State University Tennis club (August 2023 – Present)

- Organized and planned weekly group practices for groups of up to 40 participants
- Managed registration, funds, and other logistics with Montana State University
- Delegated responsibilities among officers and led meetings

Section Leader of the Montana State University Drumline (April 2025 – Present)

- Facilitated communication between section members
- Organized sectional practices
- Promoted a supportive and disciplined rehearsal environment