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 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

- Coded 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 as well.
    - 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 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/Fall 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