

F26.22 Understanding Exercise and Activity Patterns: Numerical Analysis of Commodity Wearable Time Series Data

Overview

Commodity wearables are used in many personal health and exercise training applications, are easy to use, and are readily available. The public adoption and cost, and more importantly, the continuous measurement, positions such commodities to be game-changing in the realm of health research - this is big data! This project focuses on data collection and analysis of the measures from ongoing studies in collaboration with the Winfree (SICCS) and McManis (Nursing) research labs. The student should know something about exercise and physical activity. This is a multi-disciplinary research effort!

The selected student will be able to participate with study participant recruitment and data collection. The selected student will focus on analysis in Python and Matlab/Octave. This will include a literature review looking at current time-series data analysis standards, the development of a new code base to support those and other analyses of interest, and potential conversion of some existing code for analyses from Matlab/Octave to Python. The code developed by this student will be used on data from several recent and ongoing studies.

Fitbit data collection is currently managed through the Fitbit API and the NAU-developed WearWare system. The selected student may also be able to help develop this system to interface with the Garmin or Strava API.

What the student will DO and LEARN

The student recruited for this project will be expected to meet every week at the Winfree Lab All-Hands meeting and may work with other students who are working on related analysis and programming projects.

Students in this project will then learn to collaborate in the research lab setting, develop crucial communication skills, learn collaborative programming paradigms applied to this and other projects, and learn key skill sets for big data analysis methods.

Additional benefits

Students who complete this program under this project should leave prepared to join other research labs on campus, to complete Independent Research credits with research faculty, and should have a sense of what graduate school life is like. Such student(s) will also likely be well positioned to join the Winfree Lab, where they can continue to contribute to projects, (co-)author papers, and possibly even present at international conferences (if funding for those later efforts is available).

Additional qualifications

Students who have taken INF110 (Python), CS122 (Matlab), or MAT362 (R) would be most prepared, but those courses are not prerequisites for this position.

Time commitment

[3-6] hrs/week for 30 weeks