Computer Science Capstone Topic Approval Form

The purpose of this document is to help you clearly explain your capstone topic, project scope, and timeline. Identify each area to have a complete and realistic overview of your project. Your course instructor cannot sign off on your project topic without this information.

Note: You must fill out and submit this form. Space beneath each number will expand as needed.

Any cost associated with developing the application will be the student's responsibility.

INFORM INSTRUCTOR:

Potential use of proprietary company information: (Y/N) No

ANALYSIS:

1. Project topic AND description:

   This proposal describes the creation of predictive coding to improve health outcomes for individuals using smart technology to monitor their various health data. Currently, individuals are provided a readiness score from the Oura application in the morning after waking up. While this is helpful information on the current state of overall health, the goal of this project is to provide a predictable readiness value for individuals based on real-time behaviors and estimated sleep cycles.

   This project will use machine learning to provide a predictive value of the individual's readiness score.

2. Project purpose/goals:
   a. Machine learning coding predicting a readiness score for a single user. Based on typical values for the variable, the user will input an estimated sleep duration. The machine learning algorithm will then predict the readiness score following that sleep cycle. Different durations may be entered to see the effect on the readiness score.
   b. This will be trained and tested on the data of one individual.
   c. Data will be 100 data sets (minimum) with the following breakdown:
      i. 80 sets for training (minimum)
      ii. 20 sets for testing (minimum)
   d. The project shall be delivered on schedule.

3. Descriptive methods:

   Descriptive methods will include graphing the data to better understand relationships between the variables. These will include scatter diagrams, bar charts, line plots, etc.

4. Non-descriptive method:

Non-descriptive methods will include supervised learning using different methods of regression. Different methods will be tried and tuned to improve performance. Examples of data that will be used to train the machine-learning algorithm are listed below:

   a. Total Sleep Duration
   b. Activity Score
   c. Stay Active Score
   d. Move Every Hour Score
   e. Meet Daily Targets Score
   f. Training Frequency Score
   g. Training Volume Score
   h. Activity Burn
   i. Total Burn
   j. Steps
   k. Inactive Time
   l. Rest Time
   m. Low Activity Time
   n. Medium Activity Time
   o. High Activity Time
   p. Non-wear Time
   q. Average MET
   r. Long Periods of Inactivity
   s. Readiness Score
   t. Previous Night Score
   u. Sleep Balance Score
   v. Previous Day Activity Score
   w. Activity Balance Score
   x. Temperature Score
   y. Resting Heart Rate Score
   z. HRV Balance Score
   aa. Recovery Index Score

This data is available from the Oura website for download to account holders. No personally identifiable information will be included. "Readiness Score" will be the output value from the machine-learning algorithm. "Total Sleep Duration" will be used to train the algorithm. However, once the algorithm is trained, "Total Sleep Duration" becomes the input value along with the other real-time data. Since this real-time data is only available from the Oura website, a random day will be used to prove the ability to provide a predictive "Readiness Score".

DESIGN and DEVELOPMENT:

1. Computer science application type (select one):
   a. Stand-Alone

2. Programming/development language(s) you will use:
   a. Python

3. Operating System(s)/Platform(s) you will use:
   a. Windows 11

4. Database Management System you will use (if applicable):
   a. None

5. Estimated number of hours for the following:
   i. Planning and Design: 20
   ii. Development: 40
   iii. Documentation: 40
   iv. Total: 100

6. Projected completion date:
   a. 9/30/2023

IMPLEMENTATION and EVALUATION:

1. Describe how you will approach the execution of your project:
   a. Gather data from a typical user. Ensure no personally identifying information.
   b. Remove lagging data from the dataset.
   c. Analyze the data for further insights and potential efficiencies.
   d. Develop a machine learning algorithm to provide a predictive "Readiness Score" based on user input "Total Sleep Duration".
   e. Document the project to ensure the program is user-friendly for installation and operation.

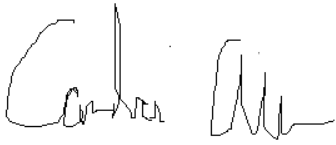✓ **This project does not involve human subjects research and is exempt from WGU IRB review.**

STUDENT SIGNATURE

Mark Netzger   **9/16/2023**
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By signing and submitting this form, you acknowledge any cost associated with the development and execution of the application will be your (the student) responsibility.

COURSE INSTRUCTOR'S SIGNATURE:

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COURSE INSTRUCTOR APPROVAL DATE: 9/18/2023