Research Proposal

Project Title: Machine Learning in Pediatric Cardiology

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Abstract: Pediatric Cardiology: The research project focuses on developing techniques for improving results in the treatment of pediatric cardiology patients using the process of enhanced data collection and advanced analytics. The teachers will participate in developing strategies for data collection, app development for effective use by pediatric patients, parents and care providers, and computational modeling for machine learning and data analysis.

My classroom research project will be able to enhance my learning experience through the use of incorporating strategies for data collection and build a working model that will collect vital data about the athletes and conditioning compared to non-athletes using their BMI, HP, and diet as predetermining factors for cardiac diseases.

Social Relevance and Potential Impact:

Many of our students and young adults are overweight and out of shape. This model will help them to self-monitor how fit they really are and help to prevent some of these situations from continuing and getting out of control.

Making a contribution, however small, to the effort to reduce mortality caused by and improve diagnosis and treatment of various heart conditions, especially in children.

Objectives/Timeline:

- Identify strategies for collecting patients' data from old cases at the hospital in order to create "learning datasets".
- Participate in developing an app for data collection.
- Research various ML algorithms in order to identify those that would be most applicable in the field of pediatric cardiology.

Week 1: Identify the problem and discuss strategies for collecting patients' data from old cases. Sessions with Dr. Shuping Ge to finalize what protocols would be necessary for "learning datasets."

Week 2: Work on identifying and analyzing app development. Work on "elevator speech." Work on lesson Plan for classroom using identified parameters and complete weekly journals.

Week 3: Research various ML algorithms to identify which would have the best fit. Complete journal for the week.

Week 4: Complete revisions to ML algorithms and set up poster for showcase. Complete weekly journal.

Week 5: Complete poster for showcase and continue to revise classroom lesson plans. Complete weekly journal.

Week 6: Complete final lesson plan, weekly journal and all materials needed.
Resources Needed: Scholarly literature on both pediatric cardiology and machine learning. Learning materials on specific machine learning algorithms.
Programming Requirements: Identifying language(s) needed to implement the app. Help and much guidance required for designing the app and writing code.
New Knowledge Needed: What is cardiac disease.Understanding of basic body types and what blood pressure and body mass index for their body types really mean. Connections to diet and cholesterol and their effects on cardiac diseases. Deeper understanding of the types of machine learning and common ML algorithms used for a variety of goals.
New Classroom Materials: Lecture notes and slideshow presentation for a lesson for high school students on machine learning and its applications in various branches of human endeavor.