**Machine Learning Helps Physicians Identify Heart Attacks Faster**

Author Bios:

Wilson W. Good is a senior PhD researcher with joint appointments at the Scientific Computing and Imaging (SCI) Institute and the Nora Eccles Cardiovascular Research and Training Institute (CVRTI) in the field of cardiac electrophysiology. Wilson has presented on this research at several international conferences and the research is currently in preparation.

Brian Zenger is a MD/PhD researcher at the Scientific Computing and Imaging Institute, Nora Eccles Cardiovascular Research and Training Institute, and the University of Utah School of Medicine in the field of cardiovascular disease.

Article:

A patient arrives in the emergency department complaining of chest pain that is shooting down their left arm. It started during their normal morning routine and has persisted for several hours. Immediately, the physician begins several tests to determine the cause of the chest pain, with the worst fear that the patient is suffering from a heart attack.

Everyday more than ??? people have heart attacks. Of these, nearly ??? people do not receive treatment in time leading to their early exit. While advancements have been made in heart attack detection, there is still room for improvement to detect them quickly and effectively. Current research efforts have focused on the electrical signals the heart emits during heart attack cases. Until now, only small amounts of the electrical signals have been analyzed. But with the incorporation of computers and machine learning, the signals are telling us more than ever before.

Machine learning is a technique developed by scientists to “teach” computers to identify unique features of complicated signals that are not distinguishable from the naked eye. The computer is given multiple sets of categorized signals all with different features. The computer then “learns” which features within the signals differentiate different categories and applies this “knowledge” to new signals. These features are subtle differences that humans have not been able to distinguish or isolate previously. The computer is then able to, using it’s “knowledge”, determine the categories each new signal belongs to.

We have used machine learning to detect changes in the cardiac signal that indicate the first signs of a heart attack. Our approach isolates the electrical signals from the heart and examines changes before, during, and after simulated heart attacks. The computer then reads these signals and categorizes the data. The two categories the computer isolates are “having a heart attack” and “not having a heart attack.” Compared to traditional human metrics the computer performs ??? % faster in determining when you are having a heart attack. The computer is also more accurate. Compared to traditional human identified metrics the computer detects a heart attack ?? % more often when a heart attack is taking place.

Using machine learning to help physicians detect heart attacks is a huge advancement in the field of cardiology. This work, in conjunction with others, could hold the key to understanding and detecting heart attacks, making death from heart attacks a thing of the past.