"Feature Enrichment Using Non-linear Functions for Classification Tasks" VCU #12-099

Applications

- Physiological signal processing
- Automatic detection of hemorrhagic shock
- Can be used for any signal that requires classification of different signal elements

Advantages

- Data are divided into more distinct variables so differences are easier to detect
- Reduced classification error from current methods

Inventors

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Market Need

Hemorrhagic shock is a condition that results from the tissues in the body not receiving the blood, and thus the oxygen and nutrients, which they need to function. This can occur when a person is bleeding and there is no longer enough blood circulating throughout the body. By measuring the arterial blood pressure (ABP) and the heart rate from an electrocardiogram (ECG), clinicians are able to determine if a body is experiencing hemorrhagic shock. Automatic detection of this state can be useful in both hospital settings and with remote subject monitoring. In order for this automated decision making system to work, the acquired ABP and ECG signals must be divided so that certain features of the signal, used in determining the condition, can be clearly distinguished.

Technology Summary

The technology is a method that takes a sequential data set with overlapping classes and performs feature enrichment for classification tasks. The method achieves this enrichment by using non-linear mathematical analysis to increase the distance between different classes without changing the information within the data set. This method is an improvement to a standard Kalman filter algorithm as demonstrated by an increase in classification sensitivity.

Technology Status

Complete method. Results show improvement of accuracy for the ECG and ABP application.
Patent Pending. U.S. and foreign rights are available.
This technology is available for licensing to industry for further development and commercialization.