

Introduction: This work represents an entry to the 2019 PhysioNET Computing in Cardiology Challenge.

Algorithm: Using the supplied biomedical data, we reduce the original 40 features to 10 principle components and include the PCA error to make 11 features. Four additional features are generated from SOFA scores. We then use a 24 hour sliding window to analyze each patient. The window allows us to train our classifier with a consistent array shape. Our classifier relies on a deep neural network implemented in Tensorflow. It uses relu, tanh, and softmax for the activation functions, RMSprop for the optimizer functions, and categorical cross entropy for the loss function. We have found that this setup works best for our current method and leads to the highest accuracy with minimal loss.

Results: Due to time constraints, we were unable to generate complete validation results before the abstract deadline. However, we tested our algorithm on a subset of patients that were not used in training our classifier. Using the supplied scoring method, the average score was -0.085. Even though the average score was negative, our algorithm correctly identified 90% of the non-sepsis patients and 40% of sepsis patients for an overall accuracy of 73%.

Conclusion: Correctly classifying 73% of patients shows our method of combining PCA and SOFA score features and classifying with a neural network is a promising approach. Since our algorithm is still a work in progress there is still room for advancement. We hope to continue our work over the summer to develop an even more effective algorithm for the early detection of sepsis.