

# Sepsis Prediction Model Based on Vital Signs Related Features

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Inspection of the data, and consultation with personnel of the local ICU led us to believe that the time patients spent in the ICU or were hospitalized is an important indicator for the risk of developing sepsis. During the longer stays in hospital number of intravenous measurements and other procedures increases, increasing the risk of blood infection. Therefore, our algorithm was based on these metrics.

We propose a solution when patients are classified to three classes, depending how much time they spent in the ICU: less than 10 hours (short), more than 60 hours (extended), and others (medium). Patients with short stay were classified applying a classification tree with six nodes based on HospAdmTime, lactate, heart rate and mean arterial pressure values. Patients with medium and extended stays in the ICU had a feature vector of 65 values formed from average values of selected physiological data (based on ANOVA analysis and tree classifiers), a number of selected laboratory measurements, and features calculated using seven vital signs. The latter features were obtained by forming a baseline window (7 to 20 hours) and comparing changes in these values with the ongoing stay in the ICU. Afterward, trained ensemble model decides if a patient developed sepsis using this feature vector of 65 values. Using our proposed features, we were able to achieve utility scores from 0.6 to 0.72 with different ensemble models on the training set. Challenge score of our script is not available, yet.