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SEPSIS: CURRENT CHALLENGES AND NEW SOLUTIONS BASED ON MODERN TECHNOLOGIES. A CLINICAL MANAGEMENT APPROACH

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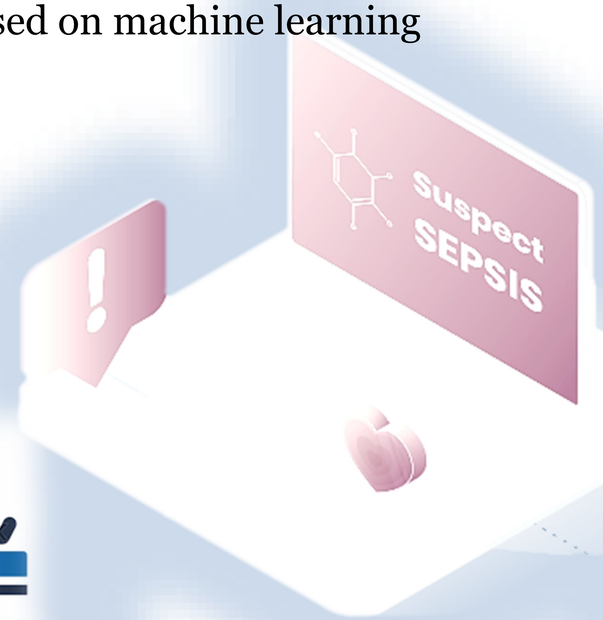
Introduction

Despite high associated mortality and high treatment costs, sepsis remains difficult to diagnose. A recent supplement to sepsis management are systems based on machine learning (ML)



Keywords

- sepsis
- early diagnosis
- machine learning based systems
- clinical application
- COVID-19

Purpose

Proof of concept and presentation of a ML-based clinical application for the early prediction of sepsis

Material and methods

The data comes from the publicly accessible database *Early Prediction of Sepsis from Clinical Data - the PhysioNet Computing in Cardiology Challenge 2019* and include 40366 intensive care clinical cases, of which 7.26% are patients with sepsis, and 92.74% - with other diagnoses. Exploratory data analysis and data processing are performed in RStudio (R programming language), and machine learning is based on the H2O platform (www.h2o.ai).

Results

Based on the processing of the large data set, an intelligent system is built, which allows the prediction of sepsis 4 hours before the onset and which can be delivered as an application for clinical use. The performance metrics are: accuracy - 0.91, specificity - 0.93 and sensitivity - 0.84.

4 hours before sepsis onset

Accuracy – 91%

Specificity – 93%

Sensitivity – 84%

A demo-version of the application is available at: https://viapascurta.shinyapps.io/ISAAC_sepsis_demo/