Using Machine Learning to Predict Septic Shock.

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1.Project Goal:
Study the efficiency of the CVRI scale on Shock-Septic and creating a machine learning model to predict Shock Septic.

2. Introduction:

Sepsis is a life-threatening condition, Shock Septic is a severe complication of sepsis.
Early diagnosis for shock-septic is crucial to proper sepsis management.
The Cardio-vascular reserve index (CVRI) is a multi-vital sign index.
In this project we're trying to see how well CVRI performs on Sepsis patients, to try and predict before they enter Septic Shock.

3. Methods:
-Read, understand and summarize the problem.

-Our database includes medical information on the patients.

-Preprocessing.

-Machine learning algorithms to predict Shock-Septic.

4. Selected Approach:
Supervised learning.

-Machine learning algorithms:
* Logistic Regression.
* Decision Tree.
* Xgboost.
* Random forest

5. Solution Description:
Data preprocessing:
- Create hourly counter.
- Read vital signs..
- Clean and impute missing data.
- Define target variable: Septic shock.
- Exploratory data analysis.

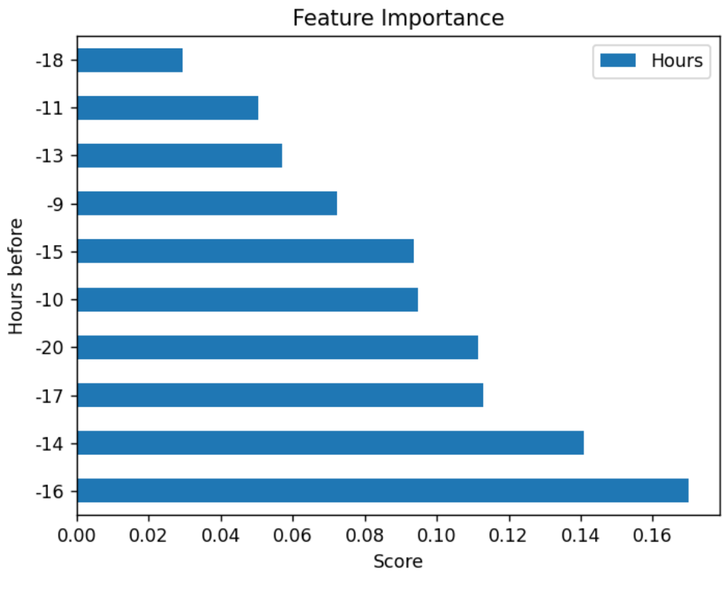
Compute CVRI

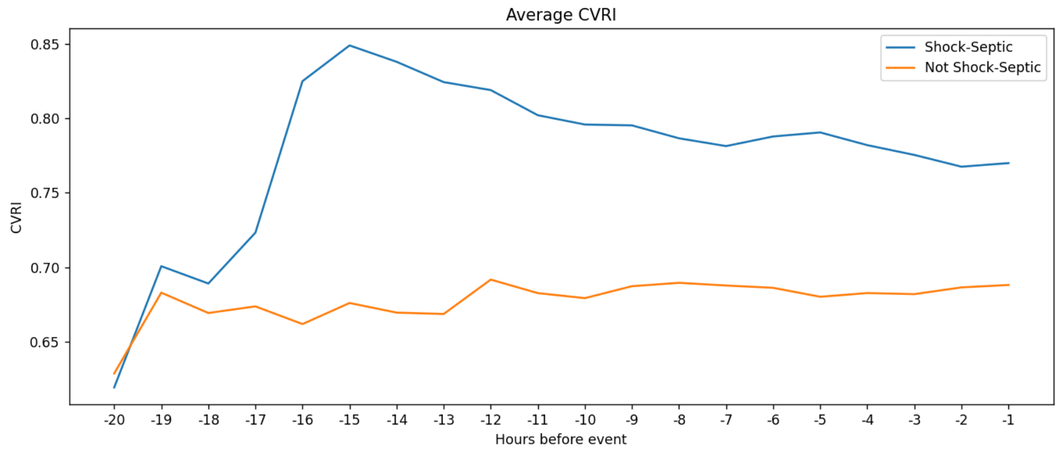
```
def calculateCVRI(MAP, HR, RR, BSA):
    result_CVRI = 18 * MAP / (HR * RR * BSA)
    return result_CVRI
```

Fill missing values

```
read_file['MAP'] = read_file['MAP'].fillna(method='ffill')
read_file['HR'] = read_file['HR'].fillna(method='ffill')
```

Main results:
- Supervised machine learning algorithms were used to examine the validity of CVRI to predict Septic Shock.
- Feature Importance results show that CVRI in the 16th hour and 14th are useful for early prediction of septic shock.





Random forest shows the best results so far on our demo data, both on Auc and Accuracy scores.

Scan QRCode for full Instructions(github) →