**Literature Review**

The sepsis syndrome occurs when an infectious agentproduces a systemic response in the host.

this condition may progress to severe sepsis with the presence of multiple organ dysfunction or

septic shock when there is a profound decrease in systemic blood pressure.

Early and accurate prediction of the onset of sepsis could facilitate effective and targeted treatment,

which could, in turn, reduce the patient death rate and lower the risk oforgan damage.

Because of the heterogeneous nature of possible infections that can cause sepsis, and the need to

process and inspect an enormous volume of time-stamped raw measurements generated by many

data sources for each patient, sepsis is difficult for physicians to recognize.

Time series and more generally, time-oriented temporal data, are sequences of discrete or continuous real-valued elements collected.

over time, such as sensor readings, network monitoring, stock market data, and patient data stored in medical records.

A few approaches has been suggested to deal with sepsis and shock septic:

* to leverage temporal abstraction and time-interval mining, which we call Temporal

Probabilistic Profiles, to improve prediction in general, and sepsis prediction in the ICU .

First, we acquire the raw, time-stamped multivariate temporal data collected by various sensors.

then, we abstract the raw time-stamped data into several interval-based abstract concepts, each belonging to one of several abstraction types.

In the third step, we discover, within the interval-based abstractions of the data, relatively frequent intervalbased temporal patterns.

Then, we create Temporal Probabilistic Profiles based on the distribution of the discovered frequent patterns.

Finally, we leverage the temporal probabilistic profiles as meta-features, to create similarity scores for the purposes of predicting sepsis.

* Studies have suggested that early reduction of heart rate variability may serve as a noninvasive and sensitive marker of the systemic inflammatory syndrome, thereby widening the therapeutic window for early interventions.

Heart rate variability had been used in the prediction of cardiovascular and cerebrovascular events, sudden cardiac death, and epileptic seizures and has yet to be used for sepsis detection.

In this approach we present a novel approach to assess the magnitude of instability in 4 common vital signs and incorporate these findings into a prediction model for the development of sepsis within an adult ICU population.

* Demonstrate that a high-performance prediction model can be derived from a combination of EMR and high-frequency physiologic data (collected at least once per second).

We further test the relationship between the prediction lead time (prediction window) and predictive accuracy of the model, and investigate questions of generalizability and interpretability of the proposed model.

* Lastly we have the Cardiovascular Reserve Index and the Vesus Shock Index.

The shock index is a bi-vital first presented in 1967 as an indicator of pending shock, but had never became a standard of car in clinical practice.

The Cardiovascular reserve index is a multi-vital sign index derived from the control theory previously proposed by Gabbay & Bobrovsky as an estimate of their cardiovascular reserve hypothesis.

SI = HR/SBP.

CVRI = 18 \* MABP/(HR \* RR \* BSA).

First, they compared the SI and CVRI predictability of early trauma death.

After they prove the efficiency of CVRI, we decided to check the CVRI scale on Septic Shock prediction and check the efficiency.

The idea is to create a Machine Learning model but instead of using the patients 4 vital index’s, we use their CVRI.