Early Detection of Sepsis

R2ii

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Task 1

Description

In order to detect Sepsis before its onset, we need to study the MIMIC dataset. The MIMIC (MIMIC-III for our case) dataset is a comprehensive database of human biomarkers collected mainly from patients admitted to the Intensive Care Unit (ICU). Around 40 or more signals are collected every hour for monitoring purposes in the ICU. We need to extract those biomarkers for each patient. Our main goal is to predict the values of these biomarkers ahead of time and then predict whether the patient is moving toward Sepsis.

Your task, at first is to understand the MIMIC dataset (which is already populated on a cloud-based server) and extract the hourly biomarkers for each patient in the following format. The exact names of the biomarkers can be acquired from here:

Subject_ID	Chart_time	Biomarker 1	Biomarker 2	$\cdots$	$\cdots$	Biomarker 40
1	Hour 1			$\cdots$	$\cdots$	
1	Hour 2			$\cdots$	$\cdots$	
1	Hour 3			$\cdots$	$\cdots$	
$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\ddots$	$\ddots$	$\vdots$
$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\ddots$	$\ddots$	$\vdots$
2	Hour 1			$\cdots$	$\cdots$	
2	Hour 2			$\cdots$	$\cdots$	
2	Hour 3			$\cdots$	$\cdots$	
$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\ddots$	$\ddots$	$\vdots$

You can query the MIMIC-III dataset using the tutorial provided at https://mimic.mit.edu/docs/iii/tutorials/intro-to-mimic-iii/

Duration:

-30 days

Task 2

Description

The Sepsis-3 definition actually defines how the sepsis is detected from the above biomarkers. Your task is to:

1. Develop functions that can evaluate the biomarkers and detect the sepsis onset.
2. Apply Multi-task Gaussian process algorithm as the dataset imputation scheme.

Duration:

-15 days