Detection and Declaration Logic for Early Warning of Pathogen Exposure
Technology #18760

Applications

This is a method for detecting pathogen exposure before symptoms become apparent. This could lead to earlier patient care and increase the probability of a positive prognosis. It may help to reduce transmission during infectious disease outbreaks by enabling monitoring patient exposure without patient isolation or contact tracing. It may also have applications in the clinical setting, helping to treat post-operative or critical care patients well before they present with symptoms such as viremia, bacteremia, or sepsis.

Problem Addressed

Current state-of-the-art techniques for detecting pathogen exposure often utilize molecular diagnostics. These methods suffer from steep logistic burdens and associated costs. They are rarely used until patients self-report or present symptoms. Less demanding techniques exist that process patients’ physiological signals for the early detection of infection. However, these techniques utilize strongly-confounded signals such as heart rate, fever, and body core temperature. There is a need for a technology, such as this, that is capable of accurately processing traditionally confounded physiological signals to indicate whether a patient has been exposed to a viral infection, bacterial infection, or other communicable pathogens.

Technology

This method for providing early warning of infection monitors physiological states before symptoms become apparent. Using machine learning models, this method trains classifiers with non-invasive patient data of physical waveforms, such as those from electrocardiography, hemodynamics, and temperature. It then applies those classifiers over a number of time intervals when analyzing an unknown patient’s data to indicate whether a patient has been exposed to the pathogen. This is a technique with high sensitivity and low specificity.

Advantages

- Pre-symptomatic indication
- Capable of processing simple physiological signals
- Can be used in public health or hospital settings

Categories For This Invention:
Lincoln Laboratory
Medical Devices
Diagnostic
Life Sciences  
Clinical Applications  
Diagnostics

**Intellectual Property:**

Detection and declaration logic for early warning of pathogen exposure  
US Patent Pending  
2018-0000428  
Methods and systems for pre-symptomatic detection of exposure to an agent  
PCT  
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**External Links:**

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