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Neural Network Machine Learning Applied to Diagnose Acute Kidney Injury

Tech ID: 32530 / UC Case 2019-802-0

ABSTRACT

Researchers at the University of California, Davis have developed machine learning models to enhance the accessibility and accuracy of acute kidney injury (AKI) testing.

FULL DESCRIPTION

Acute kidney injury (AKI) is a common complication among critically ill patients. Severely burned patients, in particular, are at high-risk - with up to 58% experiencing AKI. From a laboratory regulatory perspective, AKI testing is currently classified as moderately complex. This classification requires expert knowledge to interpret test results, limiting who is able to operate testing devices bedside. Moreover, traditional biomarkers of renal function such as creatinine and urine output (UOP) have been shown to be inadequate at predicting AKI because of factors such as naturally high biological variability. Novel AKI biomarkers have also been proposed, but their widespread use in the United States remains limited.

Researchers at the University of California, Davis have developed machine learning (ML) models using the k-nearest neighbor algorithm - a common algorithm used in neural networks for pattern recognition and classification - to enhance the accessibility and accuracy of AKI testing. This approach eliminates the need for specific medical personnel to be at the bedside, while still allowing device operators to assess potential AKI. The ML models take a combination of known laboratory data and apply algorithms to generate predictive models faster than traditional AKI testing methods. These models could identify patients at risk of AKI while reducing potential for human error. Ultimately, this technology could expand accessibility of AKI testing and enhance patient care.

APPLICATIONS

▶ Enhanced accessibility and accuracy of AKI testing

FEATURES/BENEFITS

▶ Does not require highly-trained specialists at patient bedside

▶ Can accept varying inputs, including both traditional and novel AKI biomarkers

▶ Faster than existing AKI testing methods (such as KDIGO guidelines)

▶ Minimizes the likelihood of human error

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20220301711	09/22/2022	2019-802

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OTHER INFORMATION

KEYWORDS

kidney injury, AKI, acute renal failure, machine learning, artificial intelligence, neural network, creatinine

CATEGORIZED AS

▶ **Medical**

  ▶ Diagnostics

  ▶ Disease: Kidneys and Genito-Urinary System

  ▶ Other

  ▶ Software

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