

Real-World Data Validating BeatLogic® Deep Learning Platform for Comprehensive ECG Interpretation Published in Heart Rhythm Journal Study Shows Accuracy of Deep Learning in Interpreting Multiple Levels of Remote Cardiac Monitoring Data

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Minneapolis – Preventice Solutions announced the publication of real-world data further validating BeatLogic® deep learning models designed to detect and classify multiple levels of data on heart rhythms gathered using BodyGuardian® remote cardiac monitoring technology. The technology leverages deep learning models trained to interpret electrocardiogram (ECG) data gathered while patients are wearing remote technology to monitor their heart rhythm while they go about their daily activities away from their physician’s office. This study is the first to demonstrate deep learning capabilities capable of performing both beat and rhythm classification and was [published online in the May 2020 edition of the journal, Heart Rhythm.](#)

“Advanced technologies offer us the capability of managing a significant amount of near real-time data to uncover important insights in the care of patients,” said Dr. Hamid Ghanbari, MD, MPH, a cardiovascular electrophysiologist at the University of Michigan and author on the manuscript. “This analysis continues to validate that it is feasible to train the deep learning models to closely monitor and interpret multiple levels of signals with a high level of reliability. Most important, this allows physicians to effectively utilize the volumes of data to guide their care and allow them to spend more time focusing on the patient.”

The recently published analysis utilized ECG recordings from the BodyGuardian® remote monitoring platform. BeatLogic® deep learning models were trained to detect and classify rhythms using the ECGs. Key outcomes of the study:

- Beat detection sensitivity and positive predictive value were 99.84 percent and 99.78 percent, respectively. Both results outperformed the “state-of-the-art” algorithm across every measure for beat, rhythm detection and classification.
- BeatLogic® outperformed all other algorithms on MIT Ventricular Ectopic Beats (VEB) classification.
- On the MIT-BIH Atrial Fibrillation Database (AFDB) dataset, BeatLogic® outperformed all other algorithms on Afib in the MIT AFDB library.

“The potential for remote monitoring technologies continues to grow and it means we have to offer technologies that can manage the significant amount of data that exists for each patient,” said Emily Benner, Executive Vice President Research and Product Development, Preventice Solutions. “We continue to focus our investment on technology advances that empower physicians with data that is accessible and usable as they are making clinical decisions for the individual patient. This latest advance in deep learning supports the ability to interpret multiple levels of data that are relevant to each patient experience and to do so with a high level of accuracy.”

Remote cardiac monitoring has been shown to provide clinical decision support for physicians and while algorithms have helped in capturing and even prioritizing the data, the interpretation has been left up to the physician. Yet, the immense burden of interpreting the necessary amount of data requires a critical amount of physician time for every patient they monitor. Deep learning has the potential to improve this process.

The study utilized training data from 20,932 individual records. The final training dataset consisted of more than 780 hours of ECG from 11,008 unique patients. The training annotations were created, annotated and adjudicated by a team of certified technicians.

ECG for the gold standard validation dataset was selected from real world data mined from the over 500 deidentified unique BodyGuardian® patients. Comprehensive annotation was performed by a senior team of certified ECG technicians and adjudicated by three board certified electrophysiologists. Validation was also performed using the MIT-BIH Arrhythmia Database (MIT-BIH) and the MIT Atrial

Fibrillation Database (AFDB). Dr. Ghanbari has received consultation fees from Preventice for advising on remote monitoring technology and services.

About the BodyGuardian® Remote Monitoring System

The BodyGuardian® Remote Monitoring System includes integration of the BodyGuardian® family of monitors and additional third-party sensors, the BodyGuardian® Connect smartphone and the PatientCare Platform. The system utilizes deep learning to remotely recognize AF and integrate data into the electronic health record. Patients wear cardiac monitors, which feed near real-time data into the cloud-based platform that physicians can access. Growing clinical use resulting from increased incidence of cardiac disease and a rising aging population forces a greater reliance on algorithms in order to provide high-quality reporting in a timely manner. These factors are amplified in the case of mobile cardiac telemetry (MCT), where ECG is streamed directly to data processing centers, annotated, and may be used to quickly alert clinicians of potentially critical cardiac events.

About Preventice Solutions

Preventice Solutions is a leading developer of mobile health solutions and remote monitoring services that connect patients threatened by cardiac arrhythmias with their care teams. Using insights to create revolutionary monitoring technologies, this tech-enabled, service-based approach can ultimately reduce the cost of care and improve health outcomes. The Preventice wearable portfolio includes the PatientCare Platform and BodyGuardian® family of monitors. For more information please visit www.preventicesolutions.com.