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NEW STUDY SHOWS AI-BASED FACIAL RECOGNITION CAN ENABLE PATIENT MOBILE DEVICES TO DETECT AFIB
Use of automatic selfie videos to monitor pulse and heart rhythm may offer an effortless, always-on alternative to wearable devices

WASHINGTON, DC, May 5, 2020 — A new study leverages AI-based technology to offer a contactless monitoring method for atrial fibrillation (AF) without the use of a dedicated device. The method reveals an accurate way to effortlessly identify irregular pulse rates (PR) using automatic selfie video novel videoplethysmography (VPG) software that can reside on most smartphones. Findings of the single, observational study were presented today as part of Heart Rhythm Society 2020 Science.

These findings come at a critical time when patients and physicians are becoming more reliant on telemedicine, and the COVID-19 pandemic highlights a need for contactless monitoring innovations. AF is a growing public health concern as the heart rhythm disorder impacts more than 33.5 million individuals globally[1] and is associated with high rates of reoccurrence. Further, approximately one-third of AF patients do not show symptoms.[2] New technologies can enable the detection of irregular PR and arrhythmias in asymptomatic patients or patients who would benefit from long-term monitoring.

The primary advantage of VPG technology is to enable long-term intermittent monitoring of PR without the burden of using wearable devices that need to be in contact with the skin or that require other compliance from the patient. VPG technology is embedded into a simple app running on smart devices to acquire the PR of the user. VPG signal is captured by the video camera by detecting subtle changes in the facial skin color during each heartbeat. The smart device does not record the face of the user, thereby preserving the user's privacy. The study evaluated the accuracy and quality of VPG signal captured in an uncontrolled environment.

"With the growing incidence of AF and no definite cure in sight, we sought to provide a reliable solution that would work with a simple download to a patient's device," said Dr. Jean-Philippe Couderc, Principal investigator of the NIH-funded study conducted at the Clinical Cardiovascular Research Center of the University of Rochester Medical Center (NY). "With 'always-on' technology that can work in the background as patients go about their daily lives, we hope this will help the way patients track their pulse rates and heart rhythm remotely. We see our findings as an exciting way to use AI and mobile devices to push the monitoring experience forward."

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[1] Chugh SS, Havmoeller R, Narayanan K, et al. Worldwide epidemiology of atrial fibrillation: a Global Burden of Disease 2010 Study. Circulation 2014

[2] Ahmad, Y., & Kirchhof, P. (2013). Gone Fishing (for Silent Atrial Fibrillation). Circulation, 127(8), 870–872. doi: 10.1161/circulationaha.112.000985

In the study, 60 subjects (47 men, 13 women), aged 65±8 years, were enrolled after successful electrical cardioversion or successful AF ablation. Subjects were provided a smart tablet loaded with the VPG technology and an electrocardiogram (ECG) patch for 14 days, and were asked to use a tablet twice a day using an application extracting VPG signals. The average PR and heart rate (HR) vales were extracted from the synchronized VPG and ECG signals, respectively. Machine learning was trained to reject VPG recordings associated with an error ≥10 percent in reference to HR using a 30/70 percent split of the data (validation based on 30 percent).

Findings recorded 880 video-based PR in sinus rhythm from June 2018 to May 2019. Subjects wore the ECG patch for 11 days on average (ranging from 1 to 15 days). The recorded HR varied between 40 and 122 bpm. Random Forest model was trained to reject measurements with an error <10% between VPG and ECG rates. Bland Altman applied to the validation set revealed a mean difference between PR and HR of 0.3±9.8 bpm while rejecting 33% of the VPG signals for low signal quality.

The authors place importance on complete findings as the current study is still taking place. As a next step, they plan to extend the use of this technology to determine its value in monitoring heart failure patients.

Embargo Details:
"Ai-*based Method for Monitoring Pulse Rate Using Facial Videoplethysmography Recorded with Mobile Devices"* [May 5, 2020, 5:00 p.m. EDT]

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About the Heart Rhythm Society
The Heart Rhythm Society is the international leader in science, education, and advocacy for cardiac arrhythmia professionals and patients and is the primary information resource on heart rhythm disorders. Its mission is to improve the care of patients by promoting research, education, and optimal health care policies and standards. Incorporated in 1979 and based in Washington, D.C., it has a membership of more than 7,000 heart rhythm professionals in more than 70 countries around the world. For more information, visit www.HRSonline.org.