Apple Watch able to monitor frailty in cardiovascular disease patients

30 March 2021, by Bob Yirka

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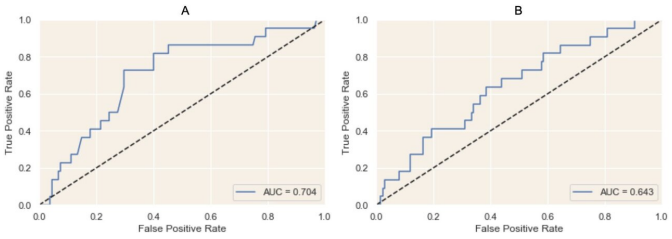
A team of researchers at Stanford University has found that the Apple Watch in association with an iPhone can be used to monitor frailty in cardiovascular disease (CVD) patients. The project group, which was funded by Apple, has posted a paper describing experiments they conducted with the Apple Watc on the open-access site *PLOS ONE*.

People with CVD often lose physical abilities because the heart is unable to keep up with increased demands. Thus, many such patients develop frailty, which is defined in this case as an inability to walk distances greater than 300 meters in six minutes. The test has been named the six-minute walk test (6MWT) and is used as a standard means of assessing the health of CVD patients—it is generally conducted in a clinical setting. In this new effort, the team at Stanford has assessed the capabilities of an Apple Watch app they developed called VascTrac that has been designed to conduct the 6MWT on CVD patients.

The team tested the app and device by enlisting the assistance of 111 CVD patients. Each was given an iPhone and Apple Watch running the VascTrac. The volunteers were then asked to test the app by attempting to walk for six minutes—both at home and in a clinical setting.

The researchers found the system could assess the frailty of the volunteers in the clinical setting with a sensitivity of 90% and specificity of 85%. At home, the numbers were 83% and 60%. The researchers say that their 6MWT system was able to provide clinically useful information for patients regarding their health in a home environment. They also note that their system could be particularly useful during emergency situations, such as a pandemic, when many CVD patients are afraid to visit a doctor's office. They also note that their experiments were conducted over many months in 2018 and 2019. Apple has since added the VascTrac abilities to the WatchOS, which means users of new Apple Watches can take advantage of the capabilities without having to download an app.



This figure represents the ability of A) at-home 6MWT data to predict in-clinic 6MWT and B) passive activity data to predict in-clinic 6MWT using a logistic regression model. The AUC of A) is 0.704 while the AUC of B) is 0.643 suggesting that passive data is nearly as accurate as an at-home 6MWT in predicting frailty as measured by an in-clinic 6MWT. Credit: *PLOS ONE* (2021). DOI: 10.1371/journal.pone.0247834

More information: Neil Rens et al. Activity data from wearables as an indicator of functional

capacity in patients with cardiovascular disease, *PLOS ONE* (2021). DOI: 10.1371/journal.pone.0247834

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