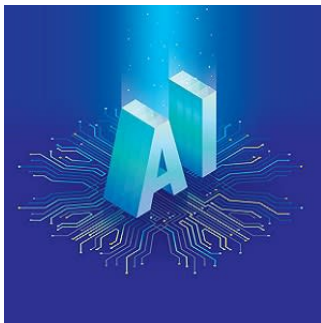## #ESCCongress: Artificial Intelligence for Heart Attack Prediction

New findings presented at the ESC Congress in Paris demonstrated technology that uses artificial intelligence (AI) to identify people at high risk of a fatal heart attack at least five years before it strikes. These findings are published in the European Heart Journal.

The technology has been developed by researchers at the University of Oxford. It is a new biomarker, or 'fingerprint', called the fat radiomic profile (FRP), that uses machine learning to detect biological red flags in the perivascular space lining blood vessels which supply blood to the heart. The fingerprint identifies inflammation, scarring and changes to these blood vessels, which are all pointers to a future heart attack.

Most people who go to hospital with chest pain undergo a coronary CT angiogram (CCTA) to check for any narrowed or blocked segments. If there is no significant narrowing of the artery, (which is the case in nearly 75% of these patients), they are sent home. But some of them still have a heart attack at some point in the future. As such, there are currently no methods used routinely by doctors that can spot all of the underlying red flags for a future heart attack.

In this study, Professor Charalambos Antoniades and his team used fat biopsies from 167 people undergoing cardiac surgery. They analysed the expression of genes associated with inflammation, scarring and new blood vessel formation, and matched these to the CCTA scan images to determine which features best indicate changes to the fat surrounding the heart vessels. They then compared the CCTA scans of the 101 people who went on to have a heart attack or cardiovascular death within 5 years of having a CCTA with matched controls who did not. The goal was to understand the changes in the perivascular space which indicate that someone is at higher risk of a heart attack. Using machine learning, they developed the FRP fingerprint that captures the level of risk. The more heart scans that are added, the more accurate the predictions will become, and the more information that will become 'core knowledge'.

They tested the performance of this perivascular fingerprint in 1,575 people in the SCOT-HEART trial, showing that the FRP had a striking value in predicting heart attacks, above what can be achieved with any of the tools currently used in clinical practice.This technology can thus enable a greater number of people to avoid a heart attack.

There are plans to roll out the fingerprint for health care professionals sometime next year, with the hope that it will be included in routine NHS practice alongside CCTA scans in the next 2 years.

Professor Charalambos Antoniades, Professor of Cardiovascular Medicine and BHF Senior Clinical Fellow at the University of Oxford said, "just because someone's scan of their coronary artery shows there's no narrowing, that does not mean they are safe from a heart attack. By harnessing the power of AI, we've developed a fingerprint to find 'bad' characteristics around people's arteries. This has huge potential to detect the early signs of disease, and to be able to take all preventative steps before a heart attack strikes, ultimately saving lives. We genuinely believe this technology could be saving lives within the next year."

Source: ESC Congress 2019
Image Credit: iStock

Published on : Wed, 4 Sep 2019