

e-Health Technical Committee NewsLetter

December 2020

On behalf of the e-Health Technical Committee (TC) of the IEEE Communications Society (ComSoc), we wish all our members a very instructive reading of this letter.

The contribution from this edition is coming from: Giorgio Quer Dir. of AI, Scripps Research Translational Institute, Distinguished Lecturer, IEEE Communications Society, Twitter: @giorgioquer, email: gquer@scripps.edu

Members of the e-Health community are invited to contact the author for further information or collaborations.

We also welcome all our members to share their research activities and field experiences through this open newsletter and to open up new opportunities for discussions and collaborations.

Editor: Dr. Nada Philip (Kingston University London, UK)

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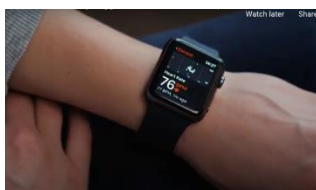
- 1) COVID-19 Detection with Wearable Sensors
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COVID-19 DETECTION WITH WEARABLE SENSORS

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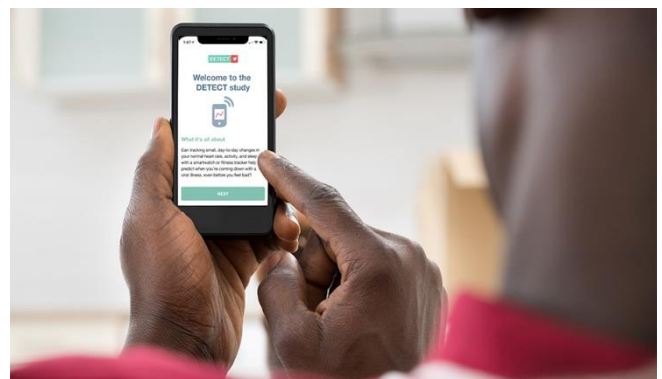
Traditional screening for COVID-19 typically includes survey questions about symptoms and travel history, as well as temperature measurements. This is not enough, as less than 30% of individuals who tested positive for COVID-19 had fever.



The DETECT study - www.detectstudy.org - launched on March 25, 2020, uses a mobile app to collect smartwatch and activity tracker data from consenting participants, and

also gathers their self-reported symptoms and diagnostic test results. Any adult living in the United States is eligible to participate in the study by downloading the research app, MyDataHelps.

This research program requires a close collaboration from experts in the IEEE eHealth community and clinical experts



in infectious diseases, bridging the gap between technology, advanced data analysis, and clinical applications. We hope that this initiative can promote further collaborations between these communities, towards the common goal of fighting this virus and promoting public health.



In our study published on October 29 in Nature Medicine [1], we showed that wearable devices like Fitbit or Apple watches are capable of identifying cases of COVID-19 by evaluating changes in heart rate, sleep and activity levels, along with self-reported symptom data—and can identify cases with greater success than looking at symptoms alone.

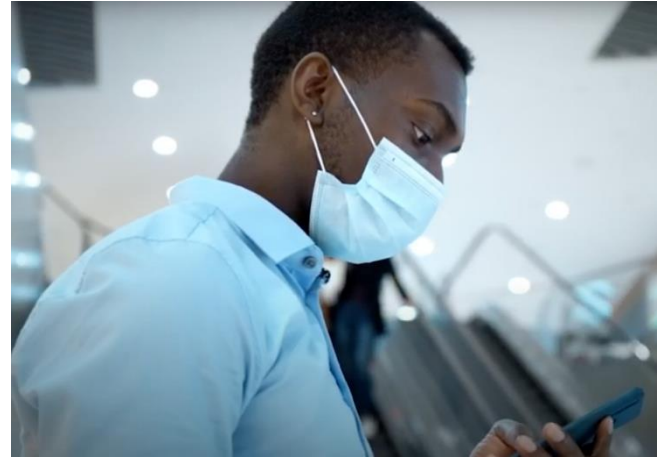
We enrolled more than 36,000 individuals in our study so far, of which several thousand reported symptoms and have been tested for COVID-19. Using our initial data collected until June 2020, we found that a combination of symptom and sensor data resulted in an area under the curve (AUC) of 0.80 (interquartile range: 0.73–0.86) for discriminating between symptomatic individuals who were positive or negative for COVID-19.

This prospective study on COVID-19 is based on a solid track record of research performed at Scripps utilizing commercial wearable sensors for public health. Previously, we have analyzed a retrospective dataset from 200,000 individuals wearing a Fitbit device for two years, investigating variations in resting heart rate and sleep and their association with health outcomes like body mass index. We have also studied how these individual variations may be used to predict influenza-like illnesses.

Such continuous, passively captured data may be complementary to virus testing, which is generally a one-off or infrequent sampling assay. Indeed, one of the greatest challenges in stopping COVID-19 from spreading is the ability to quickly identify, trace and isolate infected individuals. Early identification of those who are pre-symptomatic or even asymptomatic would be especially valuable, as people are already infectious during this period. That's the ultimate goal.

More details on this prospective digital clinical trial and our eHealth initiatives will be presented in an IEEE Distinguished Lecture: "Wearable Sensor Data to Predict COVID-19 and Viral Illnesses", which will be held online. If

you are interested in hosting this lecture at your institute, please contact gquer@scripps.edu.



[1] G. Quer, J.M. Radin, M. Gadaleta, K. Baca-Motes, L. Ariniello, E. Ramos, V. Kheterpal, E.J. Topol, S.R. Steinhubl "Wearable sensor data and self-reported symptoms for COVID-19 detection." Nature Medicine, Oct. 2020. <https://www.nature.com/articles/s41591-020-1123-x>

Call for Papers

Workshop in IEEE ICC 2021

‘Ageing Well and Living Healthy Enabling Technologies: Networking and Sensing’ (ALIVE)

Our population is getting older. The population of people over 60 years old has more than doubled in 2017, compared to 1980, and the number is expected to double again by 2050, according to the report by the United Nations. These are good news; we are healthier and living longer; however, those numbers are pushing the burdens on already distressed health care systems worldwide. Additionally, our lifestyle has shifted over the years, and we are currently living a more sedentary life, with our work and life habits. All those changes have resulted in an older population, suffering from many disabilities and chronic diseases and disorders.

The traditional healthcare systems cannot satisfy the needs of a continuously growing ageing population, since a huge number of patients must have access to health-care services. In addition, lack of standards in communication interoperability across the eHealth devices, heterogeneity of the data from the healthcare sector and the trust issues pertaining to privacy and security pose significant obstacles, which must be tackled in the near future.

ALIVE workshop solicit high-quality papers, bringing together researchers from academia and industry into a common platform to discuss the current state-of-the-art, future, and innovative solutions of eHealth, specifically targeting the wellbeing of older generation (senior citizens), enabling them to live independently at the comfort of their homes, while being as autonomous as possible to live a complete fulfilling life. The ALIVE workshop is planning to discuss new innovative solutions that target the specific 2030 sustainable goal of UN: “ensuring healthy lives and promote well-being for all at all ages”.

ALIVE workshop invites original and breakthrough works in the field of eHealth, targeting solutions aimed at enhancing the life quality of older population, through enabling them to live independently, with continuous close non-invasive monitoring of their health issues and considering each gender specific needs.

Topics

We seek original completed and unpublished work not currently under review by any other journal/magazine/conference. Topics of interest include, but are not limited to:

- Sensors for smart eHealth devices
- Wearable and medical sensors for ageing people
- New platforms and solutions for remote eHealth patients
- Non-invasive solutions for remote monitoring of elder population
- IoT system architectures for healthcare and elderly
- eHealth Challenges for elder population
- Ambient assisted living IoT for active and healthy aging
- Fog-cloud architectures and edge computing for IoT-eHealth solutions
- Interoperability and standards for IoT-eHealth
- Machine learning and artificial intelligence in eHealth
- AI and ML towards inferring activities of monitored elder population
- Digital signal processing (DSP) algorithms towards early diagnosis
- Ubiquitous computing towards pervasive healthcare
- Implantable IoT devices
- eHealth-oriented software architectures
- Privacy and security issues of eHealth and remote monitoring of seniors and eHealth
- Context awareness and autonomous computing for Ambient Assisted Living

- Future technologies for the health of the brain
- In-body medical sensors communications

Important Dates

- **Paper submission deadline:** January 20, 2021
- **Notification of acceptance:** February 20, 2021
- **Camera-ready papers:** March 1, 2021

Further details on the call can be found here: [Call for Papers | IEEE International Conference on Communications - IEEE ICC 2021 \(ieee-icc.org\)](#)