

Réanimation et pronostic

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A non invasive detection tool for COVID-19 screening based on cough sounds analysis by pretrained convolutional neural network: preliminary study

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Position du problème et objectif(s) de l'étude:

Analysis of vocal spectrum, cough sounds or respiration by artificial intelligence has been used for automatic detection of anomalies of the respiratory or cardiovascular system and neurology disorders. The current available and valid diagnosis tests for the detection of SARS-CoV-2 infection are invasive, expensive and cannot be performed remotely.

We aimed at developing a predictive tool for the detection of Covid-19 cough sounds based on the use of pre-trained convolutional neural network.

Matériel et méthodes:

We conducted an observational prospective study (validated by our hospital institutional research committee, with patient's information and non opposition). Cough samples were recorded through forced or spontaneous cough

from patients calling the emergency medical dispatch or admitted to the Covid-19 screening center or emergency department of our university hospital, and who underwent a laboratory diagnostic test for Covid-19 from Mars 2020-June 2021. Study objective was to assess the performances of pretrained convolutional neural network for discriminating between Covid-19 positive and negative patients We applied transfer learning strategies, by testing models pretrained on images or sound classification The gold standard for Covid-19 classification was the result of the diagnostic RT-PCR assay.

Résultats & Discussion:

2050 cough samples of patients have been treated and included in our database, along with patient's characteristics and the result from the SARS-CoV2 laboratory RT-PCR test. Analyses are ongoing. The performances of different open source pretrained convolutional neural network models to discriminate between Covid-19 negative and positive cough sounds will be presented.

Conclusion:

The strength of our study and cough database relies on the use of sound clinical data and laboratory-confirmed SARS-CoV2 test result that were recorded and validated by health professionals.

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