



CLAIRE
Confederation of Laboratories
for Artificial Intelligence
Research in Europe

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Open Letter to

the President of the European Commission;
the President of the European Council;
the President of the European Parliament;
the governments of the member states of the European Union;
the government of Norway;
the government of Switzerland;
the government of the United Kingdom;
the European Commission's advisory panel on COVID-19.

Subject: Leveraging artificial intelligence to help manage the Covid-19 crisis

In light of the outbreak of COVID-19, the European artificial intelligence community is hereby offering governmental agencies and public institutions support in managing the unfolding crisis, on a volunteer basis.

The effort is organised by CLAIRE (the Confederation of Laboratories for AI Research in Europe, claire-ai.org). CLAIRE has created the world's largest network of AI researchers and is working with the European Commission, national governments and other stakeholders towards ensuring and leveraging European excellence in AI.

Artificial intelligence technologies have proven effective in supporting the management of the COVID-19 crises in China, Taiwan, Singapore and South Korea¹. Europe can learn from their experiences. CLAIRE's community of Europe's leading scientists and researchers is therefore offering its skills and competence for free, with the goal to help European

¹<https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>

<https://www.itnonline.com/article/deployment-health-it-china's-fight-against-covid-19-epidemic>

governments, health systems and public administration to cope with this difficult and extraordinary situation.

CLAIRE has created a COVID-19 task-force to coordinate this support, liaise with the public institutions at the front line and ensure the effectiveness of the support given. This task-force is led by Emanuela Girardi (IT) and Prof. Gianluca Bontempi (BE), and is supported by CLAIRE's offices in The Hague (NL), Brussels (BE), Prague (CZ), Oslo (NO), Rome (IT), Saarbrücken (DE) and Zürich (CH).

Areas in which AI can be used successfully in support of managing the COVID-19 crisis include data analysis, robotics and advanced manufacturing, scheduling and resource management. Concrete examples of successful and promising uses of AI in these areas include the following:

- Intensive care data analysis: It is widely acknowledged that machine learning (ML) techniques excel in the analysis of complex signals in data-rich environments. ML predictive models could be used for early warning² and to better assess priorities in triage and therapy. Also, the use of ML in the quantitative assessment of antiviral drugs could help doctors in making better and faster choices between therapeutic options.
- Epidemiologic data analysis: Historical data could be used to better model and predict the spread of the virus. Furthermore, causal inference techniques could be applied to assess impact of containment actions³.
- Mobility data analysis: This could form the basis for earlier warning about areas of elevated risk and science-based interventions to reduce the spread of infections⁴.
- Protein and molecular data analysis: A number of existing drugs could be refactored to target the Coronavirus. The problem related to the exponential number of tests and combinations could be addressed with bioinformatics and AI techniques (e.g., optimisation)⁵.
- Open research dataset and literature analysis: Natural language processing techniques may be used to accelerate the access to literature information, as shown by the [COVID-19 Open Research Dataset](#) (CORD-19) (29,000 scholarly articles for COVID-19) made recently available to the NPL community⁶.

Furthermore, we see increasing evidence for the potential of additional AI applications (see references below):

- Distance monitoring: E-Health devices can be used to collect basic parameters (blood pressure, heartbeat, temperature, blood oxygenation) of quarantined,

²[Early prediction of circulatory failure in the intensive care unit using machine learning](#)

³[Impact of non-pharmaceutical interventions \(NPIs\) to reduce COVID-19 mortality and healthcare demand](#)

⁴[The Real-Time Monitoring System of Social Big Data for Disaster Management](#)

⁵[Computational predictions of protein structures associated with COVID-19](#)

⁶See Eric Horvitz article [Call to Action to the Tech Community on New Machine Readable COVID-19 Dataset](#)

infected people. These data can be analysed by an AI algorithm which gives early warnings when the person requires hospitalisation.

- Effective use of CT scans: The number of CT scans of patients with and without infection are increasing. Automatic image processing could help doctors in speeding up the detection of pathologies caused by the virus.
- Automatic detection of fake news: This may avoid the spread of dangerous misinformation and habits on social networks.
- Chatbots: These may be deployed for information or diagnostic in support of the emergency services, alleviating resources dedicated to interaction and triage.
- 3D printing: The scarcity of material for intensive therapy (spare parts for respirators, ventilator valves etc.) could be addressed by efficient use of 3D printing facilities.
- Robotics: Automated agents could be used to interact with infected people or to sanitise infected areas, reducing the risk for human operators.
- Scheduling and resource management: The efficient management of scarce resources in the hospitals (beds, ventilators) and other key elements of infrastructure (personnel, warehouses) could be supported by well-known AI methods from optimisation, scheduling, timetabling and rostering.

The CLAIRE research network and organisations to which it is linked include Europe's leading experts in those and closely related topics across the full spectrum of AI methods, tools and technologies.

Of course, European values play an important role in how we can and should use AI techniques, particularly those that require the use of sensitive data. CLAIRE has considerable expertise, in the form of world-leading experts in AI ethics, that can help governments and the public sector in the difficult task of safeguarding those values to the largest possible degree, while protecting the health and well-being of citizens across Europe. In working with sensitive data, our researchers are also fully committed to respecting European citizens' privacy, in accordance with European values, fundamental rights and existing regulations.

Many of the activities mentioned above are already possible in principle within Europe, but in practice they need the authorisation and the supervision of medical or governmental authorities to properly address problems of data collection, access and confidentiality. Synergy with health institutes and private companies is also essential to reach critical mass in those efforts⁷.

To speed up this process, in the context of the creation of the new "Covid-19 European team of scientific experts" (presented on 17th March), an AI expert should be included in this team, to ensure that AI technology is maximally leveraged in the efforts in dealing with the crisis. CLAIRE would be happy to propose a list of suitable candidates for this role.

⁷ [White House Urges AI Experts to Develop Tools for COVID-19 Dataset](#)

Furthermore, we suggest that the EU and national governments consider for any publicly funded Covid-19 project the following requirements: the integration of relevant interdisciplinary expertise (notably AI) with life science competencies, the dissemination of data of public interest to the European scientific community, and the implementation of a collaborative network to allow voluntary contribution.

Many scientists are motivated and ready to volunteer their capabilities, and related to the area of artificial intelligence, there is plenty of evidence that these capabilities can make a difference in managing the COVID-19 crisis. However, these scientists need a clear message from European and national authorities, as well as effective coordination. CLAIRE stands ready to provide this expertise and coordination, on a volunteer basis. Please make use of it, for the benefit of those public institutions that are in the front line in dealing with the situation, and for the benefit of citizens and societies across Europe!

With kind regards,

A handwritten signature in black ink, appearing to read 'H. Hoos', with a long horizontal stroke extending to the left.

Holger H. Hoos (on behalf of the CLAIRE COVID-19 Taskforce)

Professor of Machine Learning, Leiden University (NL)
and Chair of the Executive Board of CLAIRE

Further references on the use of artificial intelligence technology in managing the COVID-19 crisis:

How can AI help fight the pandemic:

<https://www.bbc.com/news/technology-51851292>

<https://towardsdatascience.com/spreading-ai-with-coronavirus-f97727fe0873>

<https://www.technologyreview.com/s/615342/how-baidu-is-bringing-ai-to-the-fight-against-coronavirus/>

Intensive care monitoring:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5679276/>

<https://healthmanagement.org/c/icu/issuearticle/the-future-of-icu-prediction-scores-in-the-era-of-big-data>

<https://healthitanalytics.com/news/artificial-intelligence-identifies-high-risk-covid-19-patients>

CT scanning/diagnostics:

<https://www.acr.org/Advocacy-and-Economics/ACR-Position-Statements/Recommendations-for-Chest-Radiography-and-CT-for-Suspected-COVID19-Infection>

<https://www.mobihealthnews.com/news/asia-pacific/ping-s-covid-19-smart-image-reading-system-speeds-diagnoses-and-treatment>

Robot sanitisation:

<https://qz.com/1816762/coronavirus-hong-kongs-mtr-subway-uses-robot-to-disinfect-trains/>

<https://www.cnbc.com/2020/03/18/how-china-is-using-robots-and-telemedicine-to-combat-the-coronavirus.html>

<https://www.youtube.com/watch?v=IQMMTw1f43s>

<https://www.forbes.com/sites/bernardmarr/2020/03/13/coronavirus-how-artificial-intelligence-data-science-and-technology-is-used-to-fight-the-pandemic/#2a9e9ca55f5f>

Fight against fake news:

<https://www.healthcareitnews.com/news/europe/nhs-joins-forces-tech-firms-stop-spread-covid-19-misinformation>

Outbreak and spread monitoring:

<https://www.wired.com/story/value-ethics-using-phone-data-monitor-covid-19/>

<https://www.usnews.com/news/best-countries/articles/2020-03-11/how-scientists-are-using-artificial-intelligence-to-track-the-coronavirus>

<https://www.washingtonpost.com/technology/2020/03/17/white-house-location-data-coronavirus/>

Resource management:

<https://healthitanalytics.com/news/data-platform-tracks-hospital-bed-capacity-during-covid-19-outbreak>

Bioinformatics, protein and molecular data analysis:

https://www.theregister.co.uk/2020/03/06/deepmind_covid19_outbreak/

<https://www.nytimes.com/2020/03/17/science/coronavirus-treatment.html>