

Artificial intelligence to predict which COVID-19 patients need ventilators

3 April 2020



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Experts at the University of Copenhagen, Denmark, have begun using artificial intelligence to create computer models that calculate the risk of a corona patient's needing intensive care or a ventilator.

As [coronavirus](#) patients are hospitalized, it is difficult for doctors to predict which of them will require intensive care and a respirator. Many different factors come into play, some yet to be fully understood by doctors .

As such, [computer scientists](#) at the University of Copenhagen are now developing [computer](#) models based on [artificial intelligence](#) that calculate the risk of an individual patient's need for a ventilator or intensive care. The new initiative is being conducted in a collaboration with Rigshospitalet and Bispebjerg Hospital.

"With these models, hospitals will be able to know, for example, that 40 percent of their 300 hospitalized patients will probably require a ventilator within one week. This allows them to plan and deploy their resources in the best

possible way," explains Professor and Department Head Mads Nielsen of the University of Copenhagen's Department of Computer Science.

What do the seriously ill have in common?

The algorithm harvests vast amounts of data from multiple sources. First, it was trained on patterns in data from Danish coronavirus patients who have been through the system up until now. In doing so, doctors hope to identify shared traits among the most severely affected patients. This may turn out to be the number of white blood cells, the use of certain pharmaceuticals, or something else.

"We are aware of certain things that increase risk, such as age, smoking, asthma and [heart problems](#), but there are other factors involved. After all, we hear about [young people](#) who end up on ventilators, and older people who do well without understanding why. So let's get the computer to find patterns that we aren't able to see ourselves," says Chief Physician Espen Solem of Bispebjerg and Frederiksberg Hospitals.

These patterns are compared with information from newly hospitalized patients. The data consists of X-rays, tests and measurements taken of patients at the time of their admittance to [hospital](#), along with their electronic health records.

"All data will go to a supercomputer where, within minutes, our [model](#) calculates how likely a specific patient is to require a ventilator, and how many days will go by before such a need arises. That's our goal," says Mads Nielsen.

First models ready in two to three weeks

Although the models will not be used as a basis for treating individual patients, they will be used as a planning tool that can still make a big difference for hospital staff. According to Espen Solem:

"It will be a great help if we know from the outset whether an individual patient is someone who we need to pay extra attention to, and reserve capacity for. Danish hospitals are still able to keep up, but the situation could change."

Work on the computer models is underway this week, and Mads Nielsen expects the first, rough models to be ready in two to three weeks.

"We hope that our models will be able to be used during this initial wave of coronavirus infections—otherwise, they will be beneficial during the second wave that we anticipate in autumn. Perhaps the models can also be taken to countries where the pandemic has yet to spread as widely as it has in Denmark," says Mads Nielsen.

Provided by University of Copenhagen

APA citation: Artificial intelligence to predict which COVID-19 patients need ventilators (2020, April 3) retrieved 4 December 2022 from <https://medicalxpress.com/news/2020-04-artificial-intelligence-covid-patients-ventilators.html>

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