

## Blockchain and AI to Flatten the Curve

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Abstract By The IEEE Editorial Staff

In Salamanca, Spain, –the Institute of Biomedical Research of Salamanca and the University of Salamanca–and the nonprofit Artificial Intelligent Research Institute have teamed up to design a blockchain and AI-based app that predicts the evolution of the COVID-19 pandemic.

The team is being led by IEEE Member Juan Manuel Corchado and IEEE Senior Member Javier Prieto. Corchado is director of the Bioinformatics, Intelligent Systems, and Educational Technology Research Group and Prieto is a senior researcher at the University of Salamanca [1-206].

The Institute asked the two about how the app works.

### **What problem are you trying to solve?**

With our app we are trying to provide information gathered about the COVID-19 pandemic and the evolution of the virus. We are also trying to support medical professionals and government officials about decisions they need to make regarding the pandemic, including social distancing and quarantine measures.

### **What technologies are you using?**

We are looking to use hybrid neuro-symbolic algorithms. These artificial intelligence systems incorporate both the neural networks used in deep learning and rules-based symbolic systems. The deep learning techniques will include symbolic approaches in order to increase the explainability of the models in human terms. To implement this approach, we will use the platform Deep Intelligence.

We are also using blockchain to ensure people are complying with social distancing mandates. Blockchain will allow us to create digital identities and issue licenses for tasks such as going to work or the supermarket. The licenses will include private keys to replace the paper certificates that the government has issued to citizens.

### **Explain how your projects works.**

First, we are trying to find the main factors affecting the COVID-19 spread, which includes environmental factors, genetic profiles, and social factors.

Second, we are attempting to predict the evolution of the COVID-19 pandemic according to patient information including genetic profiles, medical records, and medical treatments. This will support the decisions made by healthcare professionals.

Third, by providing people with an app, we are trying to guarantee that they are complying with social distancing and quarantine rules imposed by the government. By using blockchain, each user is associated to a digital identity and can sign in with a private key to access a certificate. The

certificate is connected to a specific digital identity and will allow citizens to go grocery shopping or go to work.

Finally, we are trying to track the COVID-19 pandemic to predict future epidemics and pandemics. The team is monitoring microorganisms likely to trigger a future healthcare crisis. We are analyzing news outlets, scientific articles, and connecting different data sources to rapidly alert health authorities, not only related to COVID-19 but also to other viruses.

### **What challenges have you faced and how did you overcome them?**

The biggest challenge is the lack of reliable data coming from the different countries. Thanks to the IEEE Xplore Digital Library making all COVID-19 related research articles available for free, we are now developing natural language processing techniques to automate the collection of data from the scientific community to feed our projects.

### **What is the potential impact of the technology?**

The technology will be able to support healthcare professionals and public health officials by providing them with information that can be used when making decisions. For example, if the data shows an increase in COVID-19 cases, officials can decide whether to shelter-in-place.

### **How close are you to the final product?**

We are at the proof-of-concept step and are trying to find additional funding for the project.

How many people are involved, and how many IEEE members are involved?

The team is made up of more than 100 people, five of whom are IEEE members.

How can other IEEE members get involved?

We are currently looking for datasets related to COVID-19. We have a small number but would like to increase that and any help would be appreciated.

Prieto added that the team is also using a 3D printer and sewing machines to make masks for healthcare workers at a field hospital set up in the Colegio Fonseca, a hotel managed by the University of Salamanca.

<https://spectrum.ieee.org/news-from-around-ieee/the-institute/ieee-member-news/researchers-spain-blockchain-ai-app-flatten-the-curve>

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