Music Capital City

5th IEEE Colombian Conference on Automatic Control

Call for student competition to present proposals on how control theory supports Covid 19 mitigation

CCAC 2021

"Controlavirus challenge"

General Description

In the framework of the fifth IEEE Colombian Conference on Automatic Control that will be held remotely on October 19-22, 2021 virtually placed on Ibagué, a student competition will be held that will award the best proposals that show applications of control theory focused on finding solutions that help mitigate the global public health problem that was originated since 2019 with the emergence of COVID19.

Motivation

One of the tools that has been key to the definition of policies to mitigate the effects of COVID-19 in different countries of the world, including Colombia, is the use of computer models that analyze the dynamics of contagion and evaluate the different forms of intervention. The concept of feedback is clear in this process of design and analysis.

The Controlavirus Challenge competition is intended to motivate undergraduate and graduate students to apply basic principles of control theory to design intervention policies to mitigate the effects of COVID-19 on communities.

Evidence on the usefulness of control theory in these epidemic mitigation scenarios can be consulted on the following links:

Paper 1: How Control Theory Can Help Us Control COVID-19, by Greg Stewart, Klaske van Heusden and Guy A. Dumont, in IEEE Spectrum.

Paper 2: A time-varying SIRD model for the COVID-19 contagion in Italy, by Giuseppe C. Calafiore, Carlo Novara, and Corrado Possieri, in Annual Reviews in Control.

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Structure of Competition

Anyone interested in participating in the Controlavirus Challenge should follow these steps:

Step 1: Register for the competition by August 27, 2021 through the following form: https://forms.gle/ZKahARUxz3ChSzQq9. The proposal should include one title, an abstract of no more than 250 words and the names and institution to which the team members belong.

Step 2: Submit a video abstract and a document with an extended abstract by October 1, 2021. The following instructions should be followed:

Video Abstract: It must have a maximum duration of 10 minutes and clearly present the main results obtained. The methodology used should be shown in detail and a discussion should be made on the feasibility analysis. It is not mandatory to present experimental results.

Extended Abstract: It should not exceed 6 pages in the IEEE format for conferences, which can be write in English or Spanish and must contain at least the following sections:

- Abstract
- Introduction
- Materials and Methods
- Feasibility analysis
- Conclusions
- References

After the review process is completed, the process will move forward as follows:

Step 3: a notification will be sent on October 8, 2021 to the projects selected to be presented during the conference. The selected projects should prepare a presentation of no more than 15 minutes where they will show to conference attendees and a panel of juries their main findings.

Step 4: a public recognition will be given to the three best proposals during the closing ceremony of the Conference, scheduled for October 22, 2021.

Instructions

- The teams will be made up of three people. Team members can be undergraduate, graduate students, or a combination of them.
- At least one of the team members of the selected team to present their proposal at the conference must register as an event attendee

Evaluation Criteria

Each proposal will be evaluated by a jury panel and a ranking will be established according to the following criteria:

- Originality (20 points)
- Technical content (20 points)
- Feasibility (20 points)
- Written document and video (quality and clarity) (30 points)
- Use of real databases (10 points)

Awards

The three best proposals will receive the following awards:

- Public recognition during the closing ceremony of the Conference.
- Publication of the paper in the journal “Ingeniería de la Universidad Distrital Francisco José de Caldas (Publindex B)” subject to the editorial conditions of the journal.
- Economic recognition as follows:

  First place: COP$700,000

  Second place: COP$650,000

  Third place: COP$400,000

References

The use of control theory to define strategies for intervention and mitigation of the effect of coronavirus on human communities has been discussed in different spaces such as:

- Paper: How Control Theory Can Help Us Control COVID-19, by Greg Stewart, Klaske van Heusden and Guy A. Dumont, in IEEE Spectrum.
- Videos: Control Theory and COVID-19, Control Theory and COVID-19: Models, Control Theory and COVID-19: Control Design, and Control Theory and COVID-19: Sensors, by Steve Brunton.

In data repositories and open database are available dynamic models that can be useful in designing and evaluating control policies for mitigating the effect of coronavirus on communities, particularly in the context of this competence. Here are some of them:

- Computational model of COVID-19 contagion dynamics in a college campus scenario: Modeling and Control of a Campus COVID-19 Outbreak, by Jeffrey Kantor, professor at the University of Notre Dame. Other interactive models and information of interest in the development of epidemiological models are related in the same link.
- SALUDATA: Observatorio de Salud de Bogotá. Here are open data on variables that characterize contagion dynamics in the city of Bogota and mitigation interventions.

Contact

Information for the Controlavirus Challenge can be found on the official website of the Conference http://www.ieeeccac2021.org/ or in the email wacuna@unicauca.edu.co and mbuenol@unicauca.edu.co

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