Special theme: PANDEMIC Modelling & Simulation

Also in this issue
Research and Society:
Meeting the Challenges of COVID-19
Joint ERCIM Actions

4 Stefano Cresci Wins the 2020 ERCIM Cor Baayen Young Researcher Award

5 ERCIM “Alain Bensoussan” Fellowship Programme

Research and Society

This section “Facing the Challenges of COVID-19” was coordinated by Peter Kunz (ERCIM Office) and Annette Kik (CWI).

6 Smart Working at CNR-ISTI in the COVID-19 Era
by Roberto Scopigno and Daniela Giorgi (ISTI-CNR)

7 Home Office - A Curse or a Blessing?
by Manuela Kos (AIT Austrian Institute of Technology)

8 Special Video Pages for the W3C Member Meetings
by Bert Bos (W3C/ERCIM)

10 From We@CWI to CWI@home
by Angelique Schilder (CWI)

11 Panel Discussion on Mobile Contact Tracing Apps at IEEE MDM 2020: A Summary
by Demetrios Zeinalipour-Yazti (University of Cyprus) and Christophe Claramunt (Naval Academy Research Institute)

Special Theme

The special theme “Pandemic Modelling and Simulation” has been coordinated by the guest editors Salvatore Rinzivillo (ISTI-CNR), Joakim Sundnes (SIMULA) and Karin Rainer (AGES)

12 Pandemic Modelling and Simulation - Introduction to the Special Theme
by Salvatore Rinzivillo (ISTI-CNR), Joakim Sundnes (SIMULA) and Karin Rainer (AGES)

14 Exploiting a Symptom Tracking Platform for Social Distancing
by Nikos Petrellis, University of the Peloponnese

16 Population Movement Monitoring Based on Mobile Phone Usage Data to Support Pandemic Decision Making
by Peter Gaal, Miklos Szocska, Tamas Joo and Tamas Palicz (Semmelweis University, Budapest)

17 Staying Safe in COVID-19
by Haridimos Kondylakis, Dimitrios G. Katehakis and Angelina Kouroubali (FORTH-ICS)
also use GPS data to locate mobile phones, is more accurate for determining the geographical location of individual mobile phone users, but only as long as the user has a smartphone, the GPS sensor of the phone is turned on and the user has agreed to share the data. In our paper, we compared the two methods and concluded that the CDR-based solution is superior for monitoring mass population movement, while the latter is better for tracking individuals, for instance in contact tracing and during quarantine, so these are complementary, rather than competitive, tools in supporting the management of epidemics.

Given that the developed methodology integrated CDR data from three major European telecommunication companies, that the algorithms automatically process these huge routine databases into information easily interpreted by high level decision-makers, and that the process is standardised and fast enough to make it relevant for swift decision making, we are convinced that it can be easily adapted by other countries. We believe this methodology is an effective and inexpensive tool to support decision-makers in combating the epidemic; minimising loss of lives and damage to the economy. It should therefore be made available worldwide for any country interested in using it in their management of the pandemic. We are happy to share further technical details with governments interested in adapting our approach in their respective countries, but also across countries at the supranational level.

The methodology being further developed in cooperation with the Artificial Intelligence Hungarian National Laboratory [L1] to expand its use in pandemic management: in particular to better understand the patterns of human interactions in the spread of the disease, to identify super-spreading events, and to evaluate the cost-effectiveness of interventions to prevent them.

The described research has received support from the Hungarian National Research, Development and Innovation Office, and the Research Excellence Programme of the Ministry for Innovation and Technology in Hungary through the Digital Biomarker thematic program of the Semmelweis University.

**References:**


https://kwz.me/h2v

Please contact: Peter Gaal, Semmelweis University, Budapest, Hungary gaal@emk.sote.hu

---

**Staying Safe in COVID-19**

by Haridimos Kondylakis, Dimitrios G. Katehakis and Angelina Kouroubali (FORTH-ICS)

*We protect the community. We protect ourselves. We decongest the health system. We stay safe in COVID-19. One of the many responses to the global call against the world pandemic of COVID-19 resulted in “Safe in COVID-19”, an electronic platform developed by the Institute of Computer Science of the Foundation for Research and Technology – Hellas (FORTH-ICS), which is intended for tracing suspect, probable and confirmed incidence cases.*

The ongoing coronavirus pandemic is affecting the lives of millions of people, while changing society by establishing new norms for social life, business and travel. The digital health domain has responded rapidly to the challenges presented by the coronavirus disease 2019 (COVID-19) pandemic, delivering multiple health apps [1] designed for training, information sharing, risk assessment, self-management of symptoms, contact tracing, home-monitoring and decision making [L1].

In response to calls from the international community [L2], the Centre for eHealth Applications and Services of FORTH-ICS developed “Safe in COVID-19” [2][3], a set of digital tools unified under a single platform focusing on artificial intelligence (AI), semantics and data management. The platform, which is based on pre-existing work on personal health record systems and integrated care solutions, is designed to support personal health management and public health.

“Safe in COVID-19” has been designed to support the needs of public authorities, health professionals and individuals. It allows public authorities to gain a better overview of the distribution of suspect, probable and confirmed COVID-19 cases through real-time statistics. The platform provides citizens with self-assessment tests to help them keep track of their health, and access to reliable personalised information and instructions with the ability to have direct contact with healthcare professionals. Healthcare professionals can gain access to digital tools to facilitate the management of COVID-19 cases and communication with patients, tailoring medical advice on patient reported status. Citizens and their families can use “Safe in COVID-19” to record their vital signs and keep track of any symptoms that might be related to COVID-19, as part of the contact tracing process.

“Safe in COVID-19” consists of three applications for different user groups: public health authorities (web app), healthcare professionals (web app), and
citizens (mobile app) [L3]. The web app for public health authorities aims to give a complete picture of the spread of the disease at a national level and the measures taken by healthcare services. It provides real-time detailed data about suspected, probable and confirmed cases; information that is useful for the surveillance of COVID-19 case distribution. The web app for healthcare providers supports online communication with registered patients to provide personalised information and coaching, and instant access to patient-reported symptoms related to COVID-19 in case of confirmed cases or symptoms that might be related to COVID-19 for probable or suspect cases. This app also supports the recording of COVID-19 laboratory test results. The mobile application for citizens supports the ability to keep daily records of health status and communicate synchronously or asynchronously with healthcare professionals in order to receive personalised instructions for health management.

Initially, the patient registers on the platform and provides self-assessment information based on a questionnaire for underlying diseases related to COVID-19 (chronic lung disease, severe heart disease, immunosuppression, diabetes, renal failure, liver failure and morbid obesity). The patient receives daily prompts to record any symptoms that might be related to COVID-19 and further self-assessment information using a visual analogue scale (VAS). These include cough, sore throat, shortness of breath or difficulty of breathing, fatigue, muscle pain, headache, runny nose or nasal congestion, diarrhoea, and loss of taste or smell. The patient can record vital parameters related to COVID-19 (body temperature, oxygen saturation SPO2, breathing rate, systolic and diastolic blood pressure and heart rate). Reminders for monitoring symptoms and vital parameters based on medical history and symptomatology help patients to stay safe at home. The app also facilitates patient access to laboratory test results.

All data are stored in a data lake, semantically uplifted and annotated using standard health ontologies. In addition, fast healthcare interoperability resources (FHIR) have been used to represent the medical data related to COVID-19. Based on the collected data, AI algorithms and epidemiological models can make predictions about how the virus is spreading in each geographic region, combining regional, country and health-system data. Instead of raw data, AI services are able to work directly on semantically uplifted data, exploiting the semantic correlation in the available data.

We anticipate that “Safe in COVID-19” will help public health authorities by easing the pressure on healthcare units, providing real-time information about the evolution of suspected, candidate and confirmed cases, providing online monitoring of the spread of the virus, and helping with decision-making regarding measures such as ordering a test or an onsite visit. Benefits for citizens include systematic recording of symptoms, self-assessment, access to personalised information, and instructions and reminders based on overall health status. Benefits to healthcare professionals include support in managing patients, reduced time in direct contact with patients, more efficient case management, and improved working conditions.

References:

Please contact:
Dimitrios G. Katehakis, FORTH-ICS, Greece
katehaki@ics.forth.gr
ERCIM is the European Research Consortium for Informatics and Mathematics is an organisation dedicated to the advancement of European research and development in information technology and applied mathematics. Its member institutions aim to foster collaborative work within the European research community and to increase co-operation with European industry.

The GATEKEEPER project, in which ERCIM is a partner, has launched a first Open Call offering an opportunity for research institutes, SMEs, Midcaps and industry with competencies in the Big Data and AI domains to apply for projects. The available budget is 600,000€ for ten projects with a duration of one year.

The GATEKEEPER 1st Open Call is now open!

GATEKEEPER is offering the opportunity to third parties to contribute to the development and sustainability of the project, working in a European environment and getting financial support.

The GATEKEEPER project is an EU-funded initiative under the Horizon 2020 Framework Programme. Its main objective is to create a GATEKEEPER that connects healthcare providers, businesses, entrepreneurs, elderly citizens and the communities they live in. This connection between stakeholders will promote an open, trust-based arena for matching ideas, technologies, user needs and processes, aimed at ensuring healthier independent lives for older adults.

- **Aim:** actively engage new technological members in the GATEKEEPER Ecosystem, supplying new Artificial Intelligence (AI) and Big Data applications, tools or components which will be incorporated into the Gatekeeper portfolio and offered to pilots and platform designers and developers.
- **Target:** start-ups, SMEs, Midcaps, industries and research technology organisations
- **Budget:** 600,000€, with a maximum of 10 projects funded
- **Deadline:** 29/01/2021
- **Project duration:** 12 months

For more information:

https://www.gatekeeper-project.eu/open-call