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MAGAZINE

New study reveals the effects of digital tracing in combination with other non-pharmaceutical interventions on the control of the Covid-19 pandemic

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The work, the result of a collaboration among the Bruno Kessler Foundation, the Isi Foundation - Turin, the University of Turin and other foreign research institutes, has been published in the authoritative journal Nature Communications. The results analyze in which cases isolation strategies and digital contact tracing via app can help contain re-emerging outbreaks

A groundbreaking study on the effect and role of **digital contact tracing during the COVID-19 pandemic** and **various policies of adopting and integrating the system with other non-pharmaceutical interventions** was recently published in the authoritative journal Nature Communications. The work is the result of a collaboration led by the **Bruno Kessler Foundation** (FBK) of Trento, together with the Polytechnic University of Lausanne (EPFL), the Technical University of Copenhagen (DTU), the University of Aix-Marseille, the ISI Foundation – Turin and the University of Turin. Among the authors are several researchers who contributed to the DP-3T protocol for privacy-preserving contact tracing, which inspired the **Apple and Google** exposure notification system used by many of the national tracking apps, including the Italian one.

The digital tracing of contacts by means of a smartphone app, such as the Italian Immuni, has been at the center of many discussions during the past year, both for the purely technological aspects and for the challenges related to citizen participation, protection of personal data, and integration into public health protection services.

The idea of contact tracing is not new, and contact tracing, traditionally understood, is known to play a crucial role in the response to the epidemic. At the start of the COVID-19 crisis, a pioneering study by Dr. Luca Ferretti, Prof. Christophe Fraser and other Oxford University researchers,

published in the journal *Science*, indicated that outbreaks containment could benefit from a smartphone app that promptly alerts users who have found themselves in close proximity to an individual who has turned out to be positive. After one year, evidence is accumulating in countries that have efficiently integrated digital contact tracing into their healthcare response (such as Switzerland and the UK) that these apps can help mitigate the impact of the epidemic. **It is therefore important to study in detail the role that digital tracing can play in combination with other non-pharmaceutical interventions for the containment of re-emerging outbreaks of the epidemic.**

The study published in *Nature Communications* – whose first authors are the **researchers of the Bruno Kessler Foundation, Giulia Cencetti and Gabriele Santin of the Mobile and Social Computing Lab research unit (MobS Lab) led by Bruno Lepri** – revealed with **a series of simulations** the effect of digital contact tracing and of various policies for the adoption and integration of the system with other interventions. Rather than making assumptions about the structure of contact networks, the study used **real proximity data of individuals**, collected from two social network science projects: the first project is the Copenhagen Network Study, led by **Prof. Sune Lehmann (DTU)**, which tracked a large group of student volunteers using smartphones; the second project is called SocioPatterns and is led by **Prof. Ciro Cattuto of the ISI Foundation – Turin and of the University of Turin**, and by **Prof. Alain Barrat of the French CNRS and of the Aix-Marseille University**: in this case the contacts were measured using **proximity sensors worn by volunteers in different environments relevant to the transmission of infectious diseases, such as schools, offices, etc.** The use of real contact data is one of the innovative aspects of the study, which provides quantitative criteria to evaluate the effectiveness of digital contact tracing according to some critical parameters, such as the delay in the isolation of alerted individuals and the level of adoption of the app in the population. **The results of the study show that isolation strategies and digital contact tracing via app can help containing re-emerging outbreaks if some conditions are met**, specifically if the spread is complemented by other interventions such as the use of face masks and social distancing, if the app is widely used and if the delay in contact isolation is reduced to the minimum. The study also shows that second-level contact tracing (the contacts of contacts, more intrusive from the privacy point of view) is not efficient and **confirms that the exposure notification mechanism of the majority of national apps, which only refers to first-level contacts and minimizes collected data, is apt for obtaining the benefits of digital contact tracing.**

Press release FBK / ISI / UniTO

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