Fraunhofer ITWM

FRAUNHOFER INSTITUTE FOR INDUSTRIAL MATHEMATICS ITWM

PRESS RELEASE

Successful Completion of the BMBF Project »EsteR«

Pandemic Prevention With Statistics Software

The Corona pandemic confronted Germany's public health departments with major challenges. Help also came from mathematics: Together with project partners, the Fraunhofer Institute for Industrial Mathematics ITWM used statistical modeling to support the health offices in the multitude of decisions that had to be made on a daily basis. Now the »EsteR« project is coming to an end and the researchers can present some exciting results and tools – tools that will also be relevant in the future.

In many places, Corona measures such as mandatory masking, testing and vaccination have been relaxed or even dropped altogether. The project »EsteR - Decision support for public health authorities by means of risk modeling for pandemic control« is also coming to an end – the results of the project remain relevant nevertheless. The algorithms developed by the researchers in the »Financial Mathematics« department are not only being used in the current pandemic: the software will also be used in the future for precautionary purposes and in similar pandemic situations.

Reliable Decision Support

Some software applications were developed in the wake of the Corona pandemic, but most were aimed only at contact tracing and contact management. Very few provided support for individual contact events, such as Corona infection in a school class. The goal of EsteR was therefore to capture complex statistical-epidemiological facts about specific infection situations.
To achieve this, the researchers focused directly on the day-to-day work of health department employees. The software environment developed by the experts had to be easy to use and understandable. Statistical evaluations, which are clearly displayed in an app, can provide mathematical support for the offices in questions such as »Who has to be quarantined if a child falls ill at school?«. The benefits of the project developments could be tested through direct cooperation with the health offices in Berlin-Reinickendorf, Bremen, Bremerhaven and Cologne.

Methods Free of Charge and Freely Accessible

By the end of the project, the researchers are making the developed methods available in the form of an app for statistical estimation of corona cases and through an R package, as a Git repository. R is a software environment for statistical calculations and graphics – and as open source software, it is free and openly accessible. The app looks

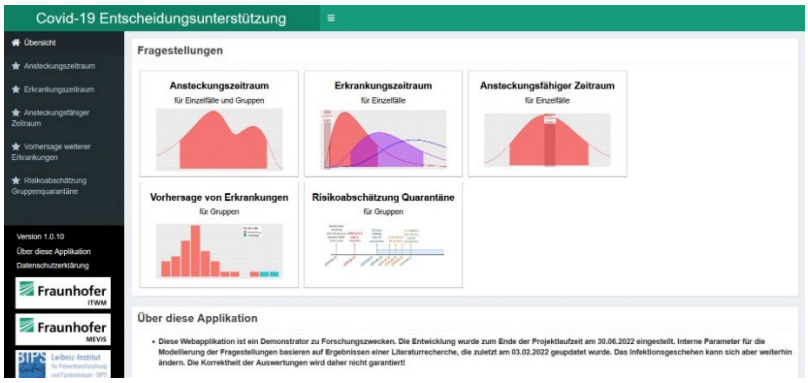
at several important pandemic aspects at once: the contagion, morbidity, and contagious period, the test for infection spread, and the risk assessment quarantine. In addition to the research at the institute, the experts were also able to be present on site in the health offices. Among other places, they gained direct insights at the Berlin Reinickendorf health office.
»It was interesting to see how diverse the backgrounds of the employees on the health department's hotline are – everything from a public health officer to an opera singer was there. One of the requirements for our app was therefore to package complex statistical facts in an easy-to-understand way so that anyone can use it quickly and without prior knowledge,« explains Dr. Stefanie Grimm, coordinator of the research focus »Data Science« as well as project coordinator and consortium leader of EsteR.

Successful Cooperation and Funding

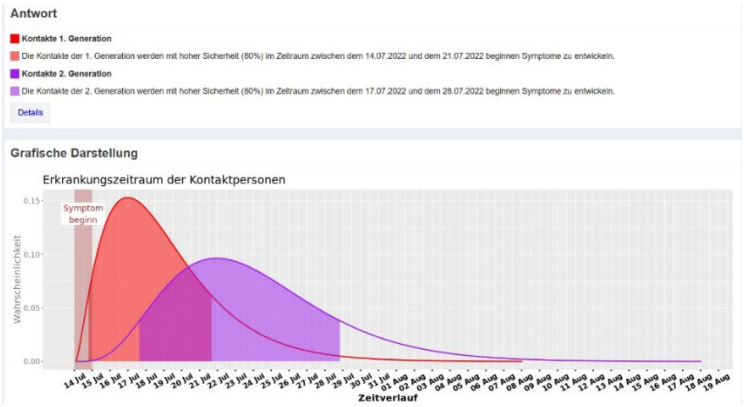
As project coordinator of EsteR, the Fraunhofer ITWM was responsible for the planning as well as the implementation of the project. In addition, the researchers took care of the app and the R package.
Support came from the Fraunhofer Institute for Digital Medicine MEVIS as well as from the Leibniz Institute for Prevention Research and Epidemiology BIPS. The Fraunhofer MEVIS researchers handled the statistical modeling of the questions, while the Leibniz Institute BIPS evaluated the statistical models through a simulation study.

As a research project dealing with the containment and prevention of infectious diseases, EsteR was funded for one year by the German Federal Ministry of Education and Research (BMBF) (Announcement »Prevention and Care of Epidemically Occurring Infections with Innovative Medical Technology«). EsteR is a follow-up project of CorASiv.

Visuals



Homepage of the web application © Fraunhofer ITWM



A person has become infected with Corona. When will affected contacts show the first symptoms? Graphical representation in EsteR © Fraunhofer ITWM

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About the Fraunhofer Institute for Industrial Mathematics ITWM

The Fraunhofer Institute for Industrial Mathematics ITWM in Kaiserslautern is one of the largest research institutes for industrial mathematics worldwide. We see our task in further developing mathematics as a key technology and providing innovative impetus. Our focus is on the implementation of mathematical methods and technology in application projects and their further development in research projects. The close cooperation with partners from industry guarantees the high practical relevance of our work.

Their integral components are consulting, implementation and support in the application of high-performance computer technology and the provision of tailor-made software solutions. Our various competencies address a wide range of customers: automotive industry, mechanical engineering, textile industry, energy and finance. This also benefits from our good networking, for example in the High performance center "Simulation- and software-based innovation".