

TRIX-DT

Sub-project of an EIT Manufacturing DigTrafoRIS Project



Smartphone App for Customized COVID Protective Respirator Mask (SMART4Custom)

This application is part of a sub-project that has indirectly received funding from the European Union's EIT Manufacturing programme via an Open Call issued and executed under project DigTrafoRIS.

The emergency situation in the Czech Republic caused by the SARS-CoV-2 pandemic revealed the unpreparedness of the society to provide highly protective equipment to healthcare professionals treating patients with suspected or proven COVID-19 disease. TRIX Connections, the start-up & spin off company of the Czech Institute of Informatics, Robotics, and Cybernetics Czech Technical University in Prague (CIIRC CTU), reacted on the urgent need and started to develop half-mask prototypes for hospitals.

The **RP95-M protective half-mask** for injection molding mass production was successfully developed in spring 2020. In June 2020, this protective FFP3 class device received a full EU Type-Examination Certification according to the EU Regulation 2016/425 (PPE regulation - EN 140:1998 and EN 140:1998/AC:1999) allowing it to be CE marked. Thanks to that, the RP95-M mask was ready to be deployed widely in Europe, fulfilling needs of the healthcare end-users.

The current model of the mask as well as the sealing has unified size to fit the majority of human faces. Nevertheless, the unified size does not necessarily provide the most comfortable solution for all people. Securing the tightness of the sealing on the human skin is a necessary prerequisite for ensuring safety of people using the half-mask. The efficacy of the half-mask is thus higher in comparison to standard FFP3 respirators being in the same safety class, but not providing sufficient sealing on the face.



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TRIX Connections, s.r.o.

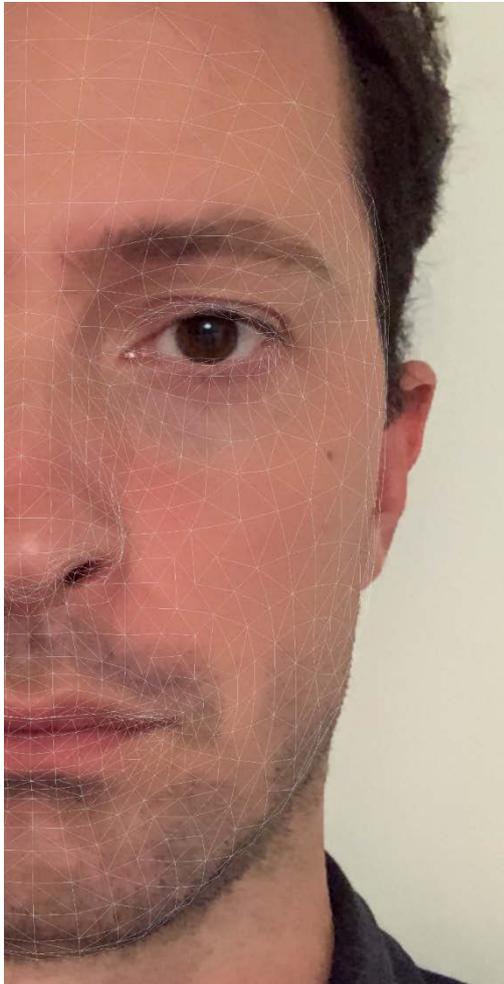
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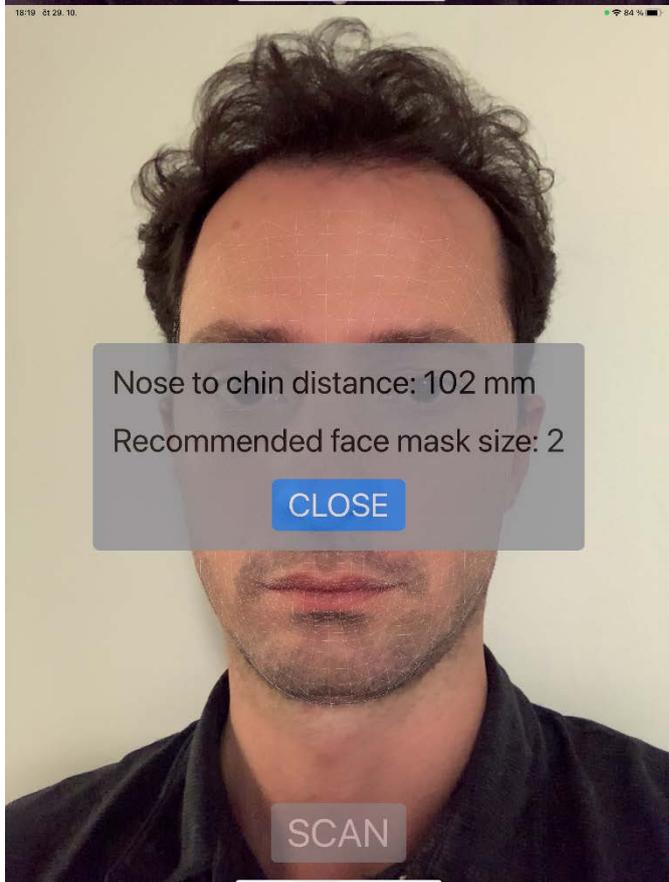
The overall objective of the project was to further develop the protective CIIRC RP95-M half-mask to reach the critical needs of the market and to make the half-mask customizable.



The customization has been provided via using modern digital technologies: depth cameras and/or laser scanners (LIDAR). The former has been widely used in mobile devices providing face identification (e.g. Apple iPhones and iPads), the latter has been introduced recently by Apple for their new iPad Pro model and is expected to be available also by the new generation of iPhones.

The identification capabilities of those widely used technologies enable gaining a 3D image of a human face and analysing its features for further classification. Faces with similar patterns will be grouped into classes.

It is possible to select one of the three available sizes of the sealing to match the scanned human face.



The application measures the face using a TrueDepth 3D camera on iPhones (X, XS, XS Max, XR) and iPads Pro.

The user places the face in front of the camera (no further than approx. 30 cm) and presses the SCAN button.

A window will appear with information about the distance of the nose from the chin in mm and recommended mask sealing size (1, 2, or 3).