Background Information

ETH Zurich, EPFL and IKRK launch joint initiative

Addressing humanitarian challenges with science and technology

<u>Zurich, 10 December 2020</u>

ETH Zurich, EPFL, and the ICRC are launching the Engineering Humanitarian Aid partnership to harness technology for the benefit of humanitarian aid. We are pleased to announce that six research projects have been awarded funding to address pressing humanitarian challenges.

Humanitarian actors in general and the International Committee of the Red Cross (ICRC), in particular, are facing major challenges. In 2019, an estimated 216 million people needed humanitarian assistance in 69 countries. Intensifying conflicts, the consequences of climate change, and the spread of infectious diseases will likely worsen existing vulnerabilities. Increasing digitisation presents new challenges for humanitarian actors in terms of data protection and cybersecurity. Innovative approaches to strengthen humanitarian action are therefore all the more important.

As institutions committed to leveraging research and innovation to address the most pressing challenges of our time, ETH Zurich and EPFL have formed a collaboration with the ICRC to develop innovative solutions for a greater impact of humanitarian action, the Engineering Humanitarian Aid initiative.

In September 2020, the three institutions issued a joint call for proposals for Humanitarian Action Challenges. Researchers from both universities were able to submit independent or joint proposals to support the ICRC in its mission to protect and assist people affected by conflict and armed violence. In Zurich, ETH4D manages the call. At EPFL in Lausanne, it is managed by the Humanitarian Tech Hub, a joint initiative of the ICRC and EPFL, and hosted at the EssentialTech Centre.

A committee comprising leadership and faculty of the participating institutions has selected a total of six innovative projects, two of which will be carried out by EPFL researchers, two by ETH researchers, and two as joint projects by researchers from both universities.

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Background Information

Awarded research projects:

Collaborative Projects between the ICRC and ETH Zurich

Decision-Making for Cost-Effective Medical Supply

ETHZ Principal Investigator:
Prof. Stephan Wagner, Logistics Management, D-MTEC, ETH Zurich

Partner(s):
Sophie Gligorijevic, ICRC

The project will support the ICRC to improve the reliable distribution of medical supplies in conflict (war) zones. Based on the analysis of several years of data from ICRC's medical supply chain as well as a qualitative study of the ICRC's organisational and process configurations, the project will identify root causes of poor information flow, model potential improvements, and propose implementable solutions. The goal is to avoid waste, improve medication availability for a better quality of service for conflict-affected populations.

Secure Infrastructure for Humanitarian Organisations

ETHZ Principal Investigator:
Prof. Adrian Perrig, Network Security Group, D-INFK, ETH Zurich

Partner(s):
Vincent Graf Narbel, ICRC

The increasing digitisation of humanitarian data flows risks making humanitarian organisations the targets of sophisticated attackers. Approaches are needed for secure computation on cloud environments, accompanied by secure global communication. To tackle this challenge, the project aims to create a mobile device and cloud computation environment for highly sensitive data of humanitarian organisations as well as a communication infrastructure that enables secure and privacy-preserving access to this environment.

Collaborative Projects between the ICRC, EPFL, and ETH Zurich

Mapping Vulnerable Populations with AI

ETHZ Principal Investigator:
Prof. Konrad Schindler, Photogrammetry and Remote Sensing, D-BAUG, ETH Zurich

Partner(s)
Prof. Devis Tuia, Environmental Computational Science and Earth Observation Laboratory, EPFL
Thao Ton That Whelan, ICRC

Background Information

This project will support the ICRC to precisely map local populations to improve the effective planning of humanitarian action. The goal of this project is to estimate population size and density, as well as related information such as settlement type and population changes. This information will be sourced from satellite images and social media posts, processed with Machine Learning algorithms, and integrated into detailed, spatially resolved population maps. This will help the ICRC to estimate the size of conflict-affected populations and potential returnees and plan its humanitarian response accordingly.

Sustainable Construction in Humanitarian Action

ETHZ Principal Investigator:
Prof. Guillaume Habert, Sustainable Construction, D-BAUG, ETH Zurich

Partner(s):
Dr. André Ullal, Laboratory of Construction and Architecture, EPFL
Pavlos Tamvakis, ICRC

Existing technologies and systems supporting more sustainable construction are not suited to the conflict-affected, often resource-strapped settings where the ICRC works. This project will adapt and extend existing technologies and systems that promote sustainable construction to provide guidance on how to use environmental impact assessment tools in humanitarian action. Moreover, it will develop a digital platform that supports the sustainable design, operation, and maintenance of humanitarian buildings and infrastructure. The goal of this project is to reduce the environmental impact, particularly on water and local habitat, in places where the ICRC is active.

Collaborative Projects between the ICRC and EPFL

Private biometrics for aid distribution
Prof. Carmela Troncoso, Spring Lab, EPFL
Vincent Graf Narbel, ICRC

Humanitarian organisations have a responsibility to ensure the efficient delivery of aid as well as fair selection of its recipients. In humanitarian emergencies, determining the identities of aid recipients is a challenging task that could be greatly facilitated through the use of biometrics. Biometrics, particularly in humanitarian emergencies, raise important privacy concerns, including the potential to expose beneficiaries' personal data. The ICRC has adopted a policy on biometrics which considers these challenges, and highlights areas where further research and development is needed. On the basis of this, this project aims to design a biometric system suitable for deployment in humanitarian settings without endangering their beneficiaries personal information.

Harmful Information Against Humanitarian Organisations
Prof. Karl Aberer, Laboratoire de systèmes d'information répartis, EPFL
Vincent Graf Narbel, ICRC

Background Information

Disinformation and hateful rhetoric, often called information warfare, are common tools to fuel ethnic and religious tensions and incite violence – including against humanitarian organisations. In 2018, aid workers combatting Ebola (including those at the Red Cross) found themselves to be victims of disinformation campaigns, which led to violence. This project aims to develop technical methods to combat mis-information directed against humanitarian organisations on social media. It aims to uncover how weaponised information impacts humanitarian organisations and to determine what can be learned about the methods employed to carry out these attacks. The overarching goal of this project is help prevent future attacks and preserve humanitarians' security in the field.

The next call for proposals opens in spring 2021.