Bringing social media to unconnected areas

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Zaatari refugee camp in northern Jordan, where researchers tested an independant messaging system. Credit: UNHCR/Photo Unit

The number of connected devices may be on the rise, but large swaths of the global population still live in areas without telecom infrastructure or a reliable internet connection. A group of EPFL researchers, working with the Pennsylvania State University and Médecins Sans Frontières, have developed a number of solutions to connect these areas.

In the Zaatari refugee camp in northern Jordan, which is home to nearly 80,000 people, internet access is spotty at best, which further isolates the refugees living there. But EPFL's Coordination & Interaction Systems Group (React), along with two researchers from the Pennsylvania State University, has tested an instant messaging system at the camp, one that operates independently of telephone and internet service providers. Their system runs on battery power and allows users to communicate with each other in unconnected areas while maintaining data security.

An inexpensive solution

The system is built around on a tiny computer already available on the market – the Raspberry Pi – and which costs just 30 dollars. The researchers programmed the computer to work like a local server, allowing anyone within a range of around 100 meters to access a web-based messaging service via Wi-Fi. This communication platform enables users to send and receive messages by simply opening their browser. The project team also took care to ensure that all data exchanged via the system is protected. "Our messaging system is fully anonymous," says Denis Gillet, the head of React. "The data is stored locally, rather than in the cloud, so that it can't be accessed from the outside or used inappropriately."

This kind of "co-located" social media platform can be used to allow people within a defined area – like a camp, music festival or building – to communicate with each other. While less versatile than conventional social media, it has the advantage of working in places without internet access. Initial results have shown that refugees who used the messaging system had a greater sense of engagement and belonging to a community. "Such messaging systems can also help call attention to the situation and living conditions in such confined areas," says Adrian Holzer, a researcher on the React team.

Connecting aid workers

The React researchers have also teamed up with Médecins Sans Frontières (MSF) to develop a system to improve information sharing between the NGO's headquarters and field operations. Aid workers in challenging humanitarian situations need to have rapid access to essential and constantly updated information, like data sheets and medical files. Here the researchers again used a Raspberry Pi, programming it to enable field workers to access MSF's shared files located in the cloud. Documents are synchronized between the Raspberry Pi and the cloud when an internet connection is available. When the internet is down, these files can still be accessed directly on the Raspberry Pi. "One of our biggest challenges was developing a single system that could be used anywhere," says Gillet. "Given MSF's working environment, our system had to operate without an [internet connection](#) or external power supply, and it had to be fast, portable and compatible with any kind of mobile device the [aid workers](#) might have."

Leveraging ICT to support humanitarian efforts

Unreliable internet access is not the only information-related challenge facing the humanitarian sector. "Technology has completely transformed our work, as we first saw with the 2010 earthquake in Haiti," explains Holzer. "Everyone – from the local population to volunteers on the other side of the world – was able to share information in order to map out the situation and identify the areas that were hardest hit." Although this collective effort brings in large amounts of data, it comes with its fair share of caveats. What sort of guarantee is there that the data collected will be used for the right purposes? That a given emergency is real? And that the aid is reaching those who need it most? The React team worked with researcher Isabelle Vonèche Cardia, who is the Deputy Director of EPFL's College of Humanities, to make sure their solutions met the four

core principles of humanitarian work: humanity, neutrality, impartiality and independence. And since we now live in a world where Tweets and photos are shared faster than they can be verified, the researchers also created a template for assessing both the risks and benefits of using the latest ICT for humanitarian purposes. "We want these technologies to be used in a targeted and well-thought-out manner so that they don't put people at risk," says Holzer.

More information: For more information, see react.epfl.ch/

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