

# Using AI, citizen science and disaster response to help victims of Hurricane Irma

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A highly unusual collaboration between information engineers at Oxford, the Zooniverse citizen science platform and international disaster response organization Rescue Global is enabling a rapid and effective response to Hurricane Irma.

The project draws on the power of the Zooniverse, the world's largest and most popular people-powered research platform, to work with volunteers and crowd source the data needed to understand Irma's path of destruction and the damage caused. Combining these insights with detailed artificial intelligence will support [rescue](#) relief organisations to understand the scale of the crisis, and deliver aid to those worst affected as soon as possible.

Irma is now judged to be the most powerful Atlantic storm in a decade, breaking previous extreme weather records and causing widespread destruction and death across the Caribbean. Tens of thousands of people have been displaced or made homeless, and well over a million are at risk from loss of critical services such as water and electricity.

The disaster poses huge challenges for crisis response teams, who need to assess as quickly as possible the extent of the destruction on islands spread over thousands of square miles, and ensure that the right aid gets to those in most need in the safest and most efficient way.

In the immediate aftermath of Irma, Oxford researchers have been working round the clock in partnership with Rescue Global, a respected

international crisis response charity, to help address this problem. The results have already supported Rescue Global to get aid delivered to some of the areas worst affected by Irma.

On September 12th the Zooniverse, which was founded by Oxford researchers, relaunched its Planetary Response Network. First trialled in the days following the Nepal earthquake of April 2015, the PRN aims to mobilise a 'crowd' to assist in a live disaster that is still unfolding. In recent days thousands of volunteers from around the world have already joined the effort. Their role is to analyse 'before' and 'after' satellite images of the islands hit by Irma and identify features such as damaged buildings, flooding, blocked roads or new temporary settlements which indicate that people are homeless.

Rebekah Yore, Operations Manager at Rescue Global, commented: "By the morning of Friday 15th September, we were told by the Zooniverse team that roughly 300,000 classifications from 7,500 people had taken place through the platform. This extraordinary effort is the equivalent to the output of one person working full-time for just over a year, or that same person working 24/7 without breaks for around 3 months. And the number of volunteers and classifications are increasing daily. This input is already having a direct effect on the ground, helping to provide situational awareness for all deployed teams."

The sheer volume of images would take an individual months to sort through, but can be analysed in a matter of hours by the 'crowd'. Because the images are often of poor quality, human observers are much better placed to perform this part of the task than computers.

For the next step, however, computers are essential, and Oxford engineering researchers have developed a suite of sophisticated artificial intelligence tools which can process the resulting data. Machine learning approaches quickly reconcile inconsistent responses, aggregate the data

and integrate information derived from other crowd-sourced mapping materials, such as the Humanitarian Open Street Maps and Tomnod. This approach generates the best information possible to inform relief efforts. This analysis enables the team to build impact 'heat maps' that identify the areas in need of urgent assistance. Oxford has considerable expertise in this area: the tools have been refined over several years and were previously used to assist Rescue Global in its response to the 2015 Nepal and 2016 Ecuador earthquakes.

The 'heat maps' enable Rescue Global to decide where to send its own small reconnaissance planes to conduct detailed aerial assessments, and to share critical information with a [multitude of governmental and humanitarian partners](#). Working closely with Airlink, who are flying in aid to a central location, Rescue Global is using information gathered through the Zooniverse platform and its own needs assessments to coordinate the onward delivery of aid through a network of boats and planes, ensuring that it gets to those who need it most.

This new technology offers an evidence-based, rational approach to disaster management. Through collaboration with crisis responders like Rescue Global, Oxford researchers are making a unique and significant difference to victims of Hurricane Irma.

Dr Steven Reece, Machine Learning Research Fellow and mapping lead at Oxford University, said: 'As always we are extremely grateful to our friends in the satellite industry for providing data and, of course, the crowd for their amazing work interpreting the imagery so quickly. This has been a sustained campaign and we've now produced heat maps for all the Virgin Islands. With Hurricane Maria increasing in strength and bearing down on the same area, we will have a lot more work ahead of us.'

Provided by University of Oxford

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