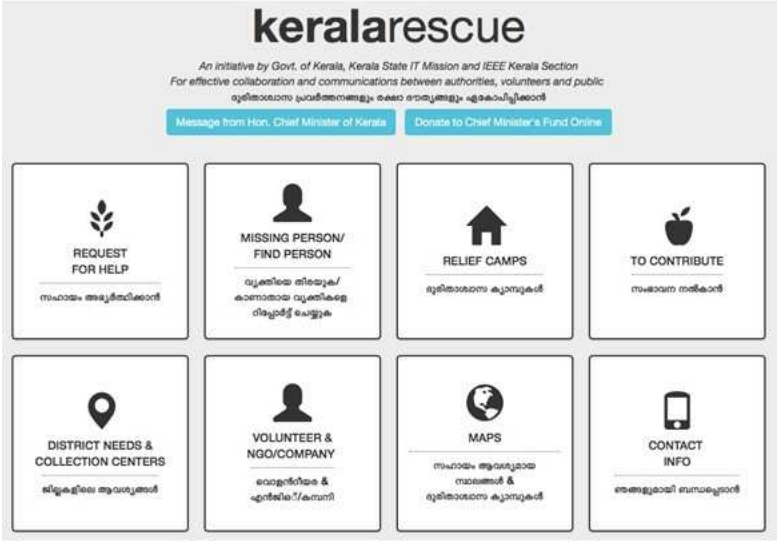
Kerala Floods - A Model of Rescue and Rehabilitation using Information Technology and Social Media based Crowdsourcing

Sebin Sabu[1] and Nora Elizabeth Joby[2]
[1]Junior Engineer, HODO Medical Analytics, Traivandrum, Kerala.
[2]Graduate, National institute of Technology, Calicut, Kerala.
Email ID: {sebinsabu08, norajoby}@gmail.com

Kerala, the green state rich with 44 rivers within an area of 38,852 km^2 and a high population density of 860/km^2 faced its worst flood of the century in mid-August 2018[1]. Rampant monsoon rainfall, landslides and the simultaneous opening of 44 dams [2] out of the 82 in the state caused devastating floods in the coastal state of Kerala [3]. The casualties were around 500 and the total loss of the state was calculated to be around 20,000 crore Rupees [4]. The National Disaster Response Force (NDRF) along with the Indian Army and Indian Navy launched one of its largest rescue mission, evacuating over 10,000 people. The response to the incident was lauded as a unique self-help mission due to the way in which the survivors and victims' worked together in the relief and rehabilitation process. The fishermen in the coastal state of Kerala with their sturdy fishing boats played a pivotal role in the rescue mission by shifting a large number of people to safer areas.

The Kerala floods also demonstrated how the usage of Information Technology (IT) and social media backed by public volunteering could build a self-evolving data crowdsourced platform that could aid the rescue and rehabilitation processes [5]. Crowdsourcing is the method of obtaining information or input into a task by making use of the services of a large number of people or devices, either paid or unpaid, typically via the Internet. Kerala, being one of the states with high digital literacy in India, also has a large smartphone using population.

Using crowdsourcing as a tool for rescue



A few student volunteers from the IEEE Kerala Section - which has a strong presence in 79 Engineering Colleges of Kerala [6] - with the support of the state run Kerala IT Mission, came up with a portal named keralarescue.in to collect help requests from across the state. The Chief Minister of Kerala released it as the official online portal for the state's rescue mission. Volunteers, majorly consisting of NGO (Non Governmental Organisation) activists and the energetic youth of Kerala, made phone calls to verify the legitimacy of inflowing requests and escalated the issue regional wise to the authorities.

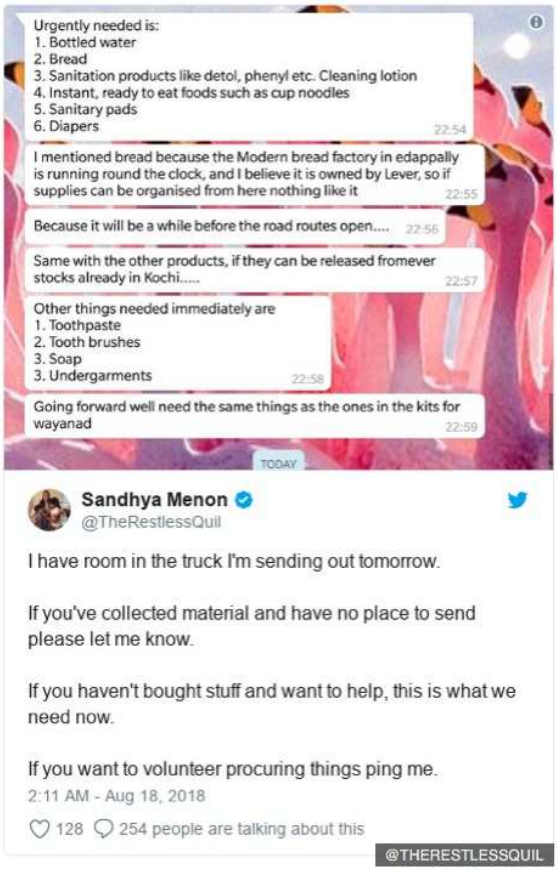
Kerala's upper hand in Information Technology showed its prowess, almost 2000 people were working day and night behind the portal to continuously improve and maintain the system. Engineers around the world worked from different time zones and ensured that development and maintenance happened round the clock. Many IT companies dedicated their development teams exclusively for this work [7]. As the rescue operations progressed, new features that could help the operation were added, and coordination was done using the popular cloud based collaboration platform Slack.

54,933 people who registered themselves as volunteers in the website did the works of verification and ground level support. The unique visitor count of the website crossed 1,363,704, and 45,587 help requests were posted through the portal.

One of the main challenges faced in the initial days of rescue was the unavailability of helpline numbers. Most of the government provided numbers were not backed with sufficient capabilities to handle the large number of incoming phone calls. Thus when many people were deprived of a chance to raise their issues with the administration, they started posting WhatsApp messages and live videos in Facebook requesting for help. Popular and active Facebook pages with regional influence, like the meme (troll) pages suspended the release of their usual posts and started posting the rescue requests from the public.

When this happened, many big and small groups like Compassionate Keralam and Anbodu Kochi [8][9] were formed both inside and outside India in order to collect these social media messages, organise them using spreadsheets and databases, verify them by making phone calls, marking priority level by considering factors like number and ages of people trapped, and to prepare proper SOS messages with geo-tags to pass on to the rescue teams through the volunteers in the district level administration. Once a rescue request was fulfilled the status would be updated. The volunteers were handling an average of 100 calls per day on identifying and verifying requests.

In Relief and Rehabilitation



As the flood levels started rising, the state also faced critical issues in managing the relief camps, since the focus of the hour had been on rescuing maximum people. Volunteering groups took up the initiative and gave support to government officials by deploying a network using WhatsApp groups where the requirements of relief camps were mapped with people who were ready to provide the supplies. Massive supplies and relief materials were brought in by the public at different hubs located at the drier regions which were less affected from the floods. These hubs acted as central collection points from which materials were redirected to camps as per demand. Almost 500 truck loads of such relief materials collected from the public were supplied from the state capital Trivandrum, and more supplies came in from the neighbouring states and cities like by road, rail and air. The efficient communication between the collection points and public through social media made sure that the public brought only those materials which were required in the camps.

Administrators, celebrities and public figures also appealed for public support in different forms through the social media. The response of the public on the ground level was overwhelming. From truck drivers to grocers to textile shopkeepers who gave their services and materials for free, everyone played their part in the relief activities. IEEE SIGHT also played a significant role in the flood relief activities by fabricating improvised power banks and flash lights as relief material, helping in restoring electrical appliances and electricity supply etc. [15]

The determination of the telecom operators to keep the networks intact played a significant role in the success of this implementation. Many operators announced free calls and data over their networks during the floods to avoid any hindrance to the rescue operations.

Comparison with similar models

Similar digitally led relief initiatives also happened during the Nepal Earthquake of April 2015, especially under the leadership of Kathmandu Living Labs (KLL). KLL played an instrumental role in mobilizing thousands of online volunteers in creating rapid digital and paper maps of earthquake-affected areas immediately after the earthquake [10].

Information Technology was primarily used for building crowd sourced maps during the Nepal Earthquake in 2015 and Haiti Earthquake in 2010 [10], while it was used as a means to collect the relief requests from victims during the Kerala Floods. The Ushahidi was an open source platform which was created in 2008 to enable the mapping of crowdsourced information about the violence that followed the 2007–2008 elections in Kenya. Its free services were used in Nepal in 2015[10], and was also adopted in Kerala during the floods.

India saw the first prominent use of social media as a tool in rescue and rehabilitation during the Chennai floods of 2015. Many crowdsourcing technologies were used to identify the most affected places and blocked roads [11]. Tamil Nadu, the state whose capital is Chennai, happens to be the nearest neighbour of Kerala that shares a diaspora of Keralite working population. Thus the systems and expertise adopted during the Chennai floods could be easily adapted into the Kerala scenario.

Discussion

The use of digital technology in post-disaster relief is a tool that can be adopted in any developing country when it faces a crisis with the cellular networks withstanding. When the rescue helpline numbers provided by the Government failed to deal with the magnitude of the situation, crowdsourced data was used in large scale for many purposes, including collecting help requests, organising and matching them to supplies, to mark flooded roads and areas, to create a geographical map of demands and supplies etc. An immediate rescue operation for a pregnant lady was made possible due to the crowdsourced data [12].

However, around 25% of the generated data entries were duplicates, since people were posting multiple requests for same issue. This was fixed using a variety of measures, starting from the simple measure of affixing date and time stamp with the queries and messages, to the usage of algorithms to filter data based on phone-numbers used in the requests. Similarly, a large quantity of food was wasted during the initial days because many people prepared food in response to the same requests. This issue was identified later on and fixed with more coordination and tracking of requests. Currently, IT based applications are being used extensively for the rehabilitation process, especially for efficiently matching the requests of people with potential help providers, and for spreading reliable news and information about the right methods of waste disposal and epidemic prevention [13][14].

There was widespread criticism that only those social media rescue requests with emotional content got immediate attention and that multiple rescue attempts were made for a particular request. Since many of the messages still circulated around these media even after rescue it led to confusion and wastage of valuable time and resources. Crowdsourcing is not an efficient model to use for rescue operations, because it always comes with the problem of biasing and duplication of data which can be a very strong disadvantage during rescue operations. Meanwhile it can be a successful tool for rehabilitation since the level of urgency is lowered, allowing for more efficient filtering and verification of data.

References

[1] http://www.census2011.co.in/census/state/kerala.html
[2] https://indianexpress.com/article/india/poor-management-of-dams-led-to-kerala-flood-leader-of-opposition-ramesh-chennithala-5320022/
[3] https://earthobservatory.nasa.gov/images/92669/before-and-after-the-kerala-floods
[4] https://indianexpress.com/article/india/483-dead-in-kerala-floods-and-landslides-losses-more-than-annual-plan-outlay-pinarayi-vijayan-5332306/
[5] https://www.bbc.com/news/world-asia-india-45218556
[6] https://webinabox.vtools.ieee.org/wibp_other_units/index/R001454
[7] https://timesofindia.indiatimes.com/city/thiruvananthapuram/a-virtual-army-that-fought-from-behind-the-screen/articleshow/65507193.cms
[8] Compassionate Keralam <http://compassionatekeralam.org>
[9] https://m.facebook.com/story.php?story_fbid=1889240951154980&id=100002072817702
[10] http://journals.sagepub.com/doi/10.1177/2053951716662054
[11] https://www.microid.in/keralaflood/#6.47/10.55/77.701
[12] https://www.ndtv.com/kerala-news/on-video-pregnant-woman-with-leaking-water-bag-rescued-in-kerala-1902022
[13] https://koodorukkam.in
[14] https://www.thehindu.com/todays-paper/tp-opinion/rescue-relief-and-renewal/article2479628.ece
[15] https://ias.ieee.org/chapters-membership.html

About the Authors

Sebin Sabu is a recent graduate of the Department of Electrical and Electronics Engineering, TKM College of Engineering, Kollam, Kerala. He was an active volunteer of IEEE and the Technical Coordinator of the Student Branch at his college. He was also a Berkner fellow of the American Geophysical Union. He is currently working as Junior Engineer at HODO Medical Informatics, Trivandrum, Kerala.
https://scholar.google.co.in/citations?user=-sMqN7IAAAAJ&hl=en&oi=ao

Nora Elizabeth Joby is a recent graduate of the Department of Electronics and Communication Engineering, National Institute of Technology, Calicut, Kerala. She was an active volunteer of her Student Branch and the Women In Engineering (WIE) Chapter. She was also a Berkner fellow of the American Geophysical Union.
https://scholar.google.co.in/citations?user=uoV5MbwAAAAJ&hl=en&oi=ao