Patrick Meier is a passionate evangelist for the power of big data to help us respond to natural disasters and other crises. He is also a careful scholar who thinks deeply about the limits and potential dangers of data-centric approaches. His book offers both inspiration for those around the world who want to improve our disaster response and a set of fertile challenges to ensure we use data wisely and ethically.

—Ethan Zuckerman, Director, MIT Center for Civic Media and author of *Rewire: Digital Cosmopolitans in the Age of Connection*

I dare you to read this book and not have both your heart and mind opened. Patrick Meier writes compellingly about his first-hand accounts of people around the world working together to help disaster victims through advanced computing solutions.

—Leysia Palen, Associate Professor and Director of Project EPIC—Empowering the Public with Information during Crises, University of Colorado, Boulder

Something very like the fog of war afflicts crisis response. On the ground, simply knowing what is wrong—who is suffering? where is the danger?—is both critical and difficult. In *Digital Humanitarians*, Patrick Meier, a scholar and practitioner of crisis response, shows us how simple digital tools, built and staffed by a worldwide network of volunteers, are providing faster and more comprehensive data for disaster response efforts. Working from examples like the Haitian earthquake and the Arab Spring, Meier shows how tools from artificial intelligence to aerial drones, and techniques from crowdmapping to distributed fact-checking, are helping to dispel some of that fog.

—Clay Shirky, Associate Professor, Arthur L. Carter Journalism Institute, New York University, and author of *Here Comes Everybody: The Power of Organizing Without Organizations*

An insider’s guide to the humanitarian data revolution, seen through the eyes of a thought leader, scholar, and expert practitioner on the front lines of a global movement that is already transforming how we understand and respond to crises.

—Robert Kirkpatrick, Director of United Nations Global Pulse

Business, economics, and governance are transforming as traditional state-based institutions are supplemented and indeed eclipsed by non-state networks of civil society. New technologies are enabling regular citizens to connect, collaborate, and save lives. In his book, Meier shows these same trends emerging in the field of humanitarian response. Global problem solving is rapidly evolving and Meier will help get you on board.

—Don Tapscott, Global Solutions Network and co-author of *Wikinomics*

This book breaks new ground as Patrick Meier charts the optimism, the possibilities, and the dilemmas of a new Digital Humanitarianism from his own first-hand experience. For anyone in the Humanitarian sector—ignore this book at your peril.

—Tarun Sarwal, Innovation Advisor, International Committee of the Red Cross (ICRC)
Meier offers an illuminating look at how digital humanitarian have been creating value from big data for nearly a half-decade. He changes the narrative surrounding the “traditional” humanitarian community—often thought to be intransigent and inflexible—by presenting examples of how humanitarian organizations are actively exploring how to incorporate big data and crowdsourcing into their decision-making processes. His authoritative volume crackles with honest insights about the current and future state of humanitarian response.

—Albert Gembara, Technology Integration Officer, United States Agency for International Development (USAID)

Patrick Meier has been the leading figure in creating a new type of disaster responders, digital humanitarians, and in this groundbreaking book he takes us through the story of how technology can truly revolutionize how we deal with some of the most chaotic events we experience.

—Gisli Olafsson, Emergency Response Director, NetHope, and author of The Crisis Leader

For all the technology firsts, this is first a story about volunteers. It is also a story about the relentless application of fundamental information technology skills, collecting, processing, and making understandable an avalanche of data. Not only is this about the heart of information technology professionals, it is about the application of information technology skills; and in a crisis, any professionals want to contribute what they know best.

—Ed Happ, Global Chief Information Office (CIO) of the International Federation of the Red Cross and Red Crescent Societies (IFRC)

This book is deeply relevant and astonishingly up to date. No surprise—Patrick Meier has been the heartbeat of digital humanitarianism long before the phrase was coined and only he could have written this account. In the early days (7–8 years ago), there were mappers and humanitarians. Patrick began writing his blog; more people from both camps began to talk to each other. And then the Haiti earthquake struck in January 2010. From that instant the story takes off. Beginning with what can be accomplished by the dedication and talent of circles of friends and alert strangers—mapping the streets of Port au Prince and finding trapped victims based on their tweets—this book traces the explosion in crisis response analytics that has created the universe of digital humanitarianism. Eminently readable and packed with details and insights, this book presents and explains a phenomenon that is still in its early stages. It deals with the potential of Big Data, issues of security and reliability, the role of artificial intelligence, and invites the reader to participate in an enterprise that is already changing the ways that governments, agencies, groups, and individuals understand and respond to crises of disaster and forced migration from war. Every consumer of world news and everyone living in a potential disaster zone must read this book to see how globalized digital sets of networks—and the volunteers behind them—are transforming our capacities to help locate, talk to, rescue, and sustain people trapped in the major calamities of our time.

—Jennifer Leaning, Professor at Harvard University’s School of Public Health and Director of Harvard University’s FXB Center for Health and Human Rights
Patrick Meier’s new book is extraordinarily timely, providing practitioners and policy makers with an accessible guide to how digital technology can help to improve humanitarian outcomes.

—Joanna Macrae, Head of Humanitarian Innovation Programme, Department for International Development (DFID)

If you want to be enlightened about how technology is revolutionizing humanitarian aid, then this book is for you. In *Digital Humanitarians* Patrick Meier depicts a humanitarian endeavor that is being enriched by the efforts of a growing global network of smart, savvy innovators. Expertly fusing front-line experience, technological expertise, and a deeply humane worldview, Meier closes with a rousing call for change: toward a more open, democratic humanitarian system. All of us working in international disaster response should be paying close attention.

—Ben Ramalingam, Chair of the Humanitarian Innovation Fund (HIF) and author of *Aid on the Edge of Chaos*

This book shows us once again why Patrick Meier is a thought leader in leveraging emerging technologies for social impact. His book captures the enormous possibilities and avoidable pitfalls of big data, social media, and artificial intelligence in crisis contexts. Digital humanitarians can be powerful agents for social change but ground-truthing what we see and hear digitally is more important than ever.

—Aleem Walji, Chief Innovation Advisor, Leadership, Learning, and Innovation, World Bank Group

Patrick Meier is a master cartographer. He is a talented crisis mapper, sure, but he’s mapping something even bigger in this book. He’s mapping the ecosystem of digital humanitarianism—the hills of human motivations, the seas of human institutions, and the urban landscape of human technology. The ideas and stories here not only plot the path for digital humanitarians in disasters, but they illuminate a runway of opportunity for all of philanthropy and social innovation in the digital age.

—Wendy Harman, Director of Information Management and Situational Awareness, American Red Cross

There has been a lot of hype about the role technology can play in the humanitarian space, with very little to show for it. Patrick Meier—in his book and in his work—is one of the few people who has gone beyond talk to show how big ideas can translate into very concrete initiatives that help save lives. He also shows a fascinating glimpse into the early days of crisis mapping and the passionate group of volunteers who are transforming the way we work. This book is indispensable reading for anyone who is interested in finding ways to incorporate technology into their work as humanitarians.

—Sharon Morris, Senior Advisor to the President, US Institute of Peace (USIP)

Patrick provides a fascinating read for anyone interested in how technology could spur the humanitarian community far into the 21st century. Building from his very personal
experience that propelled him into the digital humanitarian space, Patrick lays out the amazing achievements of many who have dreamed to change the world for the better. At the same time, and perhaps more importantly, Patrick also outlines what the humanitarian community can do to fully embrace new technologies and approaches—many of which are already revolutionizing other industries.

— Andrej Verity, Cofounder of Digital Humanitarian Network

Patrick Meier is not your stereotypical explorer, but in many respects he is the quintessential explorer. He is determined to scale and tame the peaks of Big Data that are rising unrelentingly around us in the form of social media, satellite imagery and other information. Constantly researching and analyzing successful problem-solving applications and models in cross-disciplinary fields like digital archaeology and conservation technology, Patrick is exploring new frontiers, applying innovative tools and methodologies to test and refine solutions to big humanitarian problems. Any digital explorer interested in better understanding the combined power of collective and artificial intelligence should read *Digital Humanitarians*.

— Alex Moen, Vice President, Strategic Initiative and Explorers Program, National Geographic

Patrick Meier’s brilliant and inspiring book documents the power that everyday citizens have when responding to humanitarian crises or political repression. Patrick writes from the unique perspective of having played a key role in the development and evolution of the digital humanitarian field. The book provides a wonderful combination of case studies exploring many successes and challenges and also has a critical and necessary exploration of the many ethical issues around the use of technology in humanitarian work, such as privacy, safety, power, and agency. This book is a must read for students, faculty, policymakers, activists, simply anyone who is engaged or seeking to engage in technology for social change.

— Craig Zelizer, Professor at Georgetown University and Associate Director of Conflict Resolution Program

In this definitive and often gripping account, Patrick Meier traces the rise of a new generation of global humanitarians who are using social media, satellite, and aerial drone imagery, microtasking, big data, and other digital tools to respond to natural disasters and political humanitarian crises. A leader himself in the efforts to develop and network digital tools for social good, Meier shows how technology, idealism, and global social networking are rapidly coevolving to empower local actors and enhance the world’s ability to respond to complex emergencies. This is a fascinating, important, and deeply hopeful book about the way digital tools are facilitating and transforming global cooperation.

— Larry Diamond, Director, Center on Democracy, Development, and the Rule of Law (CDDRL), Stanford University

Intelligent, well-written, and inspiring, *Digital Humanitarians* offers an agenda for how the world can use technology to transform the lives of people in crisis. It combines a rare
understanding of the state-of-the-art in innovation and technology with sensitivity to
the most pressing global challenges. It should be read by anyone who cares about our
common future.

—Alexander Betts, Associate Professor and Director of the Humanitarian
Innovation Project, University of Oxford

Patrick Meier is the inspiring thought leader behind digital humanitarians, a grassroots
revolution with a reach and impact that in only a few years has transformed global
humanitarian response. The activation and contribution of digital humanitarians are
today an essential part of humanitarian response operations in disaster-affected areas
all over the world. Patrick’s book provides for an absolutely essential, practical, and
inspiring account of the origins and future of this new humanitarian realm, where
human ingenuity, new technologies, and computational power create unprecedented
opportunities for saving human lives. I consider this book as authoritative core reading
for academics, practitioners, and policy makers for years to come.

—Bartel Van de Walle, Cofounder, Information Systems for Crisis
Response and Management (ISCRAM) and Associate Professor, Department
of Information Management, Tilburg University

In clear, compelling prose, Patrick Meier offers readers of Digital Humanitarians a front
row seat into the start of the digital revolution that has swept the world since he and his
colleagues created—from scratch and on the fly—a digitally based response to the 2010
earthquake that devastated Haiti. He explains the strengths and potential weaknesses
of using big data and crowdsourced analytics in crisis situations. It is at once a deeply
personal and intellectually satisfying book.

—Steven Livingston, Professor of Media and Public and International Affairs
at the Elliott School of International Affairs
at George Washington University (GWU)

Technological and methodological developments are rapidly changing the face of
humanitarian action. We are encountering a flurry of new tools involving cell phones
and Internet-based platforms for data aggregation, analysis, and visualization. We are
exploiting the potential of collective and artificial intelligence. We are collecting data
from satellites and drones while we are also involving thousands of people in reporting
events, locations of assets, and places of danger. In Digital Humanitarians, Patrick Meier
provides an interesting and useful overview of these developments, and offers examples
drawn from years of hard-earned experience. This is essential reading for both students
and practitioners of humanitarian action. Those who read it will be able to navigate this
important, exciting, and dynamic field.

—Joseph G. Bock, Teaching Professor, Eck Institute for Global Health,
University of Notre Dame, and author of The Technology of Nonviolence:
Social Media and Violence Prevention
Patrick Meier is a humanitarian in the trenches—working tirelessly to use technology for the greater good. In his new book, he highlights the latest solutions revolutionizing humanitarian response, ranging from social media platforms powered by artificial intelligence to crowd computing solutions that analyze satellite and UAV imagery. Throughout the book, however, Patrick returns to the fundamental story behind these technologies—the human story, the digital humanitarian volunteers who mobilize across time zones to help others in need. As Patrick says, “This is the kind of world I want to live in.”

—Claire Diaz-Ortiz, Director of Social Innovation, Twitter

Meier’s book is essential reading on at least two counts. First, it captures key developments on and around the use of web, Internet and mobile communications during and after disasters, cutting through the hype and grappling with critical questions related to technology and governance. Second, it is a timely publication. The preparation, response to and recovery from disasters today is inextricably entwined with technology, at local, regional and international levels. Meier looks at how what is already taken for granted came about, and looks critically at what it means for humanitarianism in the future.

—Daniel Stauffacher, Former Swiss Ambassador to the United Nations and Founder of the ICT for Peace Foundation (ICT4Peace); Sanjana Hattotuwa, Special Advisor at ICT4Peace & TED Fellow

Finally, someone who knows both the potential of mobile, networked technologies and the practicalities of how to use these tools to enhance humanitarian work. Meier’s new book, Digital Humanitarians, has the potential to relieve suffering by showing activists, citizens, and technologists how to use everything from satellite imagery to big data techniques and social media to save lives in natural disasters and other crises that require humanitarian response. This book can save lives!

—Howard Rheingold, Lecturer at Stanford University and author of bestsellers Smart Mobs, Net Smart and Virtual Reality

The ideas and lessons in this book could save millions of lives in the 21st century. Digital tools—from crowdsourced mobile data to satellite imagery—promise to make the world more transparent, more inclusive, and more locally empowered. Patrick Meier charts a bold new course for humanitarianism that harnesses technology’s revolutionary potential, while also addressing the need for safeguards. His brilliant combination of scholarship, real-world experience, and thoughtful perspective makes this essential reading for anyone who wants to understand the future of humanitarian action.

—Andrew Zolli, Futurist and author of Resilience: Why Things Bounce Back

Since it became possible for nearly anyone with a cell phone or an Internet connection to send data, photos, and other information around the world with a few key strokes, we’ve seen a number of books attempt to catalog this incredible revolution. What makes this book different—and exceptionally important to humanitarians and peacebuilders alike—is that it has been written from the perspective of one who has helped to lead the
revolution. If you want to understand both the power and the pitfalls of digital humanitarianism—a movement unprecedented in human history—read Patrick’s take on it. You’ll be richer for it.

—Sheldon Himelfarb, Director of PeaceTech Lab, United States Institute for Peace (USIP)

Patrick Meier has been at the center of the digital humanitarian movement for all of its recent history. This thoughtful collection of case studies and analyses provides a first-hand account of how the tools, practices and community of digital humanitarians have succeeded, stumbled, and evolved. There’s a welcome mix of accessible technical content and, more importantly, stories about the people who’ve taken technology and shaped it into tools that help others when they’re most in need.

—Tariq Khokhar, Data Scientist and Open Data Evangelist, World Bank

*Digital Humanitarians* is a MUST-READ for anyone who believes that new technologies and big data, when used properly, can save millions of peoples lives during disasters and times of crisis. Meier is not only a master storyteller of real world events, he is a practitioner and visionary who is showing governments and NGOs, and all of us how to think and do disaster relief in the 21st century.

—Andrew Rasiej, Founder of Personal Democracy Media and Senior Technology Advisor at Sunlight Foundation

If you’re looking for a window into the rapidly expanding world of online volunteers, this book is for you. In this timely tome, Meier, who played a seminal role in redefining how we think about “digital humanitarianism” after the devastating earthquake in Haiti in 2010, deftly explores the significant opportunities for public good and serious risks to privacy, security, and misallocated resources, at the worst of times. From data analysis to data quality, he digs in to what’s possible with distributed intelligence and what’s still needed, including machine learning and frameworks for verification. In a world that brims over with potential to help one another through our newly networked devices, Meier’s book provides a map for how to do it better.

—Alexander Howard, Writer and Founder of “E Pluribus Unum”
To Chrissy,

Thank you for surviving the earthquake

And for saying “Yes”
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Foreword

*Digital Humanitarians* examines how new uses of technology and vast quantities of digital data are transforming the way societies prepare for, respond to, cope with, and ultimately understand humanitarian disasters.

There was a time when humanitarian response was the purview of an elite, hardened set of type A personalities devoted to saving the lives of those coping with the perils of major conflicts and disasters. These humanitarians were a class not dissimilar to the brave pioneers traveling west in search of adventure, forging new paths in the midst of contexts where there were few rules, many dangers, and where the rewards were great. For humanitarians, the reward of course was not gold or land, but the chance to make a difference in the lives of countless of their fellow human beings beset by disaster. Yet, the tangible measures of their success were difficult to grasp. Stories of how many days these brave individuals went without sleep, showers, adequate food, and how they coped with a variety of different dangers created a picture of the context, but afforded little information about the effectiveness of the international humanitarian system, let alone the efforts of local communities in dealing with disaster.

There was something strangely and romantically exciting about this period, though the reality was that there was very little concrete empirical evidence to demonstrate the effectiveness of aid: it was often slow in coming, and there was a dearth of information about what affected people’s needs were and how well-matched the international system’s response was to these needs. There was no sense of coordination between local disaster-affected communities and international agencies, let alone amongst humanitarian agencies themselves.

Two major things happened in the mid 2000s that would dramatically change how we (the citizens of the world) would come to understand and cope with disasters. The first was a series of reforms that took place within the international humanitarian system (the Humanitarian Reform Process), and the second was the proliferation of mobile communications technologies, the rise of social, digital media, and access to vast quantities of all kinds of data (digital text, SMS, tweets, satellite, and UAV imagery), all in the hands of anyone with the inclination, drive, and motivation to do something constructive with it.
The latter phenomenon is the subject of this captivating new book written in highly accessible prose. It sheds light on the groundswell of citizen-led direct participation in disaster relief. Gone are the days where a dearth of information meant that only a very few had direct knowledge of what happened during disasters and with the ensuing response. Whereas previous generations of concerned citizens were passive recipients of news delivered by newspapers and television reports, today’s citizens are active participants in disaster relief and response, creating millions of pieces of information, novel information, in texts, tweets, and images made available in real time.

The result is that the humanitarian field has been forever changed by the advent of Big Data and the attendant challenges of dealing with it accurately and quickly.

Patrick Meier weaves together a story of human dedication, innovation, and stick-to-itiveness that starts that fateful day in January of 2010 when a massive earthquake devastated Haiti, killing hundreds of thousands of people and leaving many thousands more injured and in need of massive amounts of humanitarian assistance. This response was different, though, in that it not only included local communities, the national government of Haiti, and thousands of international humanitarians and agencies that make up the international humanitarian system, but the efforts of large numbers of digital volunteers who worked together to respond to massive numbers of tweets and text messages to identify the locations of people trapped in the rubble, but still alive and texting for help. This is novel and this is just the beginning of the story.

Patrick narrates a human tale that is intermixed with rapid advances in technology, computing power, proliferation of mobile smartphones, the rapid expansion in the use of social media (especially Twitter, Facebook, and YouTube), and the advent of a mass amount of accessible commercial and private imagery made available through both satellites and unmanned aerial vehicles (UAVs or drones). These disparate technologies and sources of information are brought together in a nearly disjointed and manual manner to start (in Haiti handling tens of thousands of SMS messages—from a dorm room!), and with each experience in responding to natural disasters and conflict, the landscape changes. By the time we reach the finale, four short years later, we are in a completely different world where a dedicated, global network of volunteers, whom Patrick calls “digital humanitarians” (a network of loosely affiliated people bound by a humanitarian calling and access to the Internet and Twitter), stand on
call, ready to work hand-in-hand with machines that are programmed to learn from humans how to handle, code, and interpret tens of millions of short messages being sent through Twitter and other sources.

*Digital Humanitarians* tells the compelling story of how mobile technologies, computer applications, and vast quantities of digital data work in concert with a dedicated global network of new humanitarians ready to shed light on disaster-affected areas in hours, not days or weeks. Just how quickly the technology, applications, and processes are developing is astounding. One gets the sense of being hurled from the Middle Ages to the Enlightenment at exponentially increasing velocity.

This is a world where dedicated people work closely with and in increasingly elegant and synchronous ways with the technologies and applications they have created to better the lives of those most affected by disasters. But this is a rapidly changing world, one where in the moment you get your bearings, the context has completely changed. Nor is Patrick naïve to the dangers presented by these technologies in the hands of those with less meritorious intentions than the digital humanitarians he writes about. Though this community is writing the rules for the safe and appropriate uses of these technologies as they go, Patrick is cognizant of the need to codify ethical standards in doctrine, and to ensure that the use of technology and Big Data for disaster response is even safer than older analog technologies were just a few short years ago. What he’s not willing to do is sit back and wait for the world to catch up. He’ll be where he’s most comfortable, among a network of like-minded and kind-hearted people who are two steps ahead of the rest.

Dr. Enzo Bollettino
Executive Director of the Harvard Humanitarian Initiative (HHI)
Harvard University
This is the story of thousands of largely anonymous volunteers who stepped forward in times of need. They worked long, sleepless hours for free and without expectation of praise (or blame). They did this because they saw a need. My role in this, given the accidents of interest and experience, has often been as a catalyst. While the stories that follow are told from my own voice and perspective, this should not be interpreted as taking away from the hundreds and thousands of other volunteers who each have their own stories to tell. On the contrary, I seek to amplify some of our shared stories based on how I personally experienced them. Like others, I simply found myself in the midst of these digital humanitarian efforts due to happenstance and the convergence of my professional interests and personal needs. One of these needs was to do something—anything—to fill those dreadful hours not knowing whether the woman I loved had survived the earthquake in Haiti. I did not catalyze the digital response to the earthquake with a grand strategy in mind. I reacted because I was anxious and desperate. From that point on digital humanitarian efforts took on a life of their own.
Acknowledgments

The stories that follow would not exist were it not for the hundreds and thousands of digital volunteers who continue to support relief efforts worldwide. So my deep gratitude goes to them first and foremost. In writing these stories, I have also benefited from invaluable feedback, both in terms of style and content. My parents, brother, and wife read every word of every page, providing me with the kind of insightful, personal guidance that only a caring family can offer. My professional and academic colleagues reviewed my final drafts with a remarkable level of detail. I am thus particularly grateful to Carlos Castillo, Sanjana Hattotuwa, Muhammad Imran, Steven Livingston, Andrej Verity, and Sarah Vieweg. I also thank my publisher Lara Zoble, who immediately understood what I wanted to do with these stories, and I am equally grateful to Andrea Verity for her design of the perfect cover for this book, which includes profile pictures of some of the remarkable digital humanitarians who I’ve had the honor of learning from over the years. Last, but certainly not least, I had the luxury of writing the bulk of this book during my residency fellowship at the Rockefeller Foundation’s center in beautiful Bellagio, Italy. So I want to sincerely thank Rob Garris and the entire Bellagio team for providing what was truly the perfect environment for fruitful reflections and writing.
The Rise of Digital Humanitarians

Do you remember where you were at 4:52 p.m. on January 12, 2010? I will never forget.

I was in Boston—in my dorm room to be exact—catching up on emails while watching CNN. A minute later, a powerful earthquake devastated the city of Port-au-Prince. I was paralyzed with shock and could barely breathe when the news hit CNN. Over 100,000 Haitians and humanitarians were feared dead, a number that would double in the days that followed. My wife could easily have been part of that statistic. She was doing research in Port-au-Prince at the time and was due back in Boston the next day. I called and texted her cell phone; I sent her emails and looked for her on Skype and social media. While I found dozens of Haitians and expats describing the devastation live on Twitter and Facebook, there was no sign of her anywhere on social media. Only after midnight did I finally get an SMS from Haiti. She and our friends were alive; they had narrowly escaped a collapsing building. Few in Haiti were as lucky as dozens of aftershocks claimed more lives through the night.

My own story could have ended there, with that SMS. But what happened between 4:53 p.m. and the following morning when the light of day returned would ultimately change the future of humanitarian response. That night was the genesis of an extraordinary story. In the midst of this terrible tragedy, a powerful movement was born, aided by digital technologies and driven by thousands of volunteers who cared and wanted to help; they were the first rays of hope that signaled the rise of today’s digital humanitarians. This book is their story. Our story. My story.

*Digital humanitarians* will alter the way you think about what it means to be a humanitarian. Anyone can be a digital humanitarian, absolutely no experience necessary; all you need is a big heart and access to the Internet.
So you’re welcome to join us online at Digital-Humanitarians.com and make these stories part of your life. Consider this an open invitation.

**MAPPING HAITI LIVE**

CNN began to recycle the same footage of the Haiti earthquake over and over. I muted the television. Silence returned as I sat in shock. Outside, evening spilled into night. It was the middle of winter and bitterly cold. I felt utterly helpless, refreshing my email inbox every 5 seconds for a sign of life from my wife. The anxiety was nearly paralyzing. I needed to focus, to do something—anything. So I launched a digital “crisis map” for the Haiti earthquake with a lot of help from friends, colleagues, and even complete strangers.¹

A crisis map (or help map) is simply an online digital map like Google Maps or OpenStreetMap, but one that pinpoints areas hardest hit by a disaster and where people who are most affected need help. I turned CNN back on and began mapping some of the few news reports coming out of Haiti. When the news became repetitive again, I turned to social media. I had found dozens of Haitians tweeting live from the country’s capital, describing the devastation and urgent needs they witnessed while walking through the rubble-filled streets. A tweet is like a public SMS, which everyone can read by simply going to Twitter.com. Some of these short messages coming from Port-au-Prince provided enough geographical clues to be placed on the crisis map. One tweet, for example, included the address of a pharmacy in the neighborhood of Pétionville that was still open and stocked with first aid supplies. I used the digital mapping website Ushahidi.com (which means “witness” in Swahili) to map what Haitians were witnessing.² Ushahidi is a free online mapping platform developed in Africa. You can think of Ushahidi as an email account connected to a Google Map. But Ushahidi’s inbox is not limited to receiving emails. This inbox can also receive tweets and text messages (SMS), for example. So I set my Ushahidi inbox to collect all tweets that contained the words Haiti and earthquake. The resulting tweets would then appear in my inbox—like that tweet about the drug store, for example. I’d then copy the text of the tweet from the Ushahidi inbox and add it to the map. This would create a dot on the digital map, which anyone could click on to read the original text of the tweet. Taken together, these hundreds of dots
portrayed a rough, near real-time, assessment of the earthquake’s impact and the resulting needs on a single, interactive map.

But most tweets were impossible to map. Indeed, only a very small fraction of these public messages included street names. Several tweets, however, did refer to hospitals, schools, churches, shops, markets, hotels, or restaurants. So I Googled the names of these schools and shops in hopes of finding clues on the World Wide Web as to where in Port-au-Prince these buildings were located. But finding exact locations was difficult and very time-consuming. So I reached out to several friends on Skype for help. Skype allows you to make free calls straight from your computer or smartphone and can also be used to “chat” live (in writing) with others who have a Skype account.

My friends and I created a chat group where we posted tweets that could potentially be mapped. At times, several of us would collaborate on mapping just one tweet if it seemed particularly important. With some creative detective work, ample stubbornness, and the aid of Google Earth, we were able to map dozens of urgent tweets. Google Earth is simply a global, “zoomable” map of our planet made from high-resolution satellite imagery. We also began to monitor and map updates posted on Facebook groups created by Haitians in the United States. They were in direct contact with their loved ones back home and thus able to share very specific and up-to-date information, which they posted to Facebook. Shortly after midnight, while mapping one of these updates, I received the text message. My wife was alive. I closed my eyes as tears swelled. My nightmare was over. She’d be home soon.

The sound of singing brought me back. On CNN, video footage of Port-au-Prince captured the soft sound of hopeful voices singing in the darkness. Fearing more aftershocks, many Haitians whose homes were still standing were too scared to reenter them. So they sat in the pitch black of the night, singing and rocking gently to keep each other strong. While my own nightmare was over, the nightmares of most Haitians were just beginning. So my friends and I kept on mapping through the night, using Skype to coordinate our efforts. We didn’t sleep that night, or much of that week or month, for that matter.

As daylight returned to the Caribbean the following day, we were overwhelmed by the amount of information being published on social and mainstream media. We had tens of thousands of unread tweets in our Ushahidi inbox and simply couldn’t keep up with the vast volume and velocity of news coming out of Port-au-Prince. I thus reached out to fellow
classmates at The Fletcher School and also emailed several undergraduate students at Tufts University. Since our crisis mapping efforts were entirely digital and thus online, we could even turn to friends and colleagues from other countries to ask for their help. All they needed to do was jump on Skype for a crash course on crisis mapping.

The fact that many of us in Boston were students at the same university meant that we were already part of an existing social network. In other words, our offline friendships and connections facilitated our online mobilization and ties to other social networks both in the U.S. and abroad. For example, exchange students at The Fletcher School reached out to fellow classmates at their home universities in Switzerland and elsewhere, which led to new “situation rooms” being set up across the world—all volunteer driven, and all geared toward supporting our digital humanitarian efforts in Boston. This global reach soon meant that we could map 24 hours a day.

By Saturday afternoon, about 100 hours after the earthquake struck, we had trained well over a hundred volunteers, both in person and via Skype. All of them were now digital humanitarians, able to help map the damage and urgent needs being reported from Haiti across multiple media. My dorm room had become a “nerve center” of sorts for these digital humanitarians efforts. At one point, the room was so packed with digital humanitarians that new volunteers couldn’t get past the stairwell. So that’s where they were trained and where many also volunteered. I was in awe and deeply moved by this human wave of goodwill. Many of these students were pulling all-nighters in the middle of their winter holidays (and later during classes) to help Haitians affected by the disaster. And most volunteers who showed up at my dorm were complete strangers, friends of friends, neighbors, parents, teachers, staff, etc. At one point, I remember looking up from my laptop at the faces of volunteers around me—there were well over a dozen different nationalities represented, a mini United Nations of digital volunteers.

The map in Figure 1.1 was like no other map that I or anyone else had ever seen. This map did not look the same for more than 10 minutes as volunteers kept posting new reports of damage and needs day and night. The map was alive: a living, breathing organism. By the end of the first week, we had collectively mapped several hundred individual reports. But we were still lagging behind. Our Ushahidi inbox had exploded with hundreds of thousands of unread tweets. We were unable to keep up with the huge volume of news on the Haiti earthquake and desperately needed more help, more filters to find the most important tweets. So
we kept training as many new volunteers as possible every day—often several times a day.

**SUPPORTING SEARCH AND RESCUE EFFORTS**

That Sunday night, a U.S. search and rescue (SAR) team in Haiti got in touch with us via Skype. They had learned about our crisis mapping efforts from one of the digital volunteers, John Crowley, who had joined us in my dorm room. His contacts proved invaluable in linking our efforts directly to the relief efforts on the ground. So on one snowy Boston night, we found ourselves Skyping live with a SAR team stationed in Haiti—we being a bunch of students and strangers cramped into my small dorm room more than 1,500 miles north of Port-au-Prince. This felt highly surreal. The SAR team had set up camp right off the runway of the international airport in Port-au-Prince and needed to know the exact GPS coordinates for seven incomplete street addresses as soon as possible as they had received reports from various sources that potential survivors were still buried under the
rubble at these locations. Their search and rescue helicopters would be heading out at 6:00 the next morning to look for these survivors.

The Google Map of Port-au-Prince at the time was very sparse; half of the roads had not been mapped. Meanwhile, detailed road maps of Haiti were practically impossible to find. So Anna Schulz—a digital volunteer who had pleasantly surprised herself by how good she was at finding location information using satellite imagery—kindly offered to assist the SAR team. It took Anna only an hour on Google Earth to find the GPS coordinates for six of the seven locations. She got on Skype to update the SAR team in Port-au-Prince. But the seventh location remained a frustrating mystery. All the SAR team had for location 7 was “Un Bon Prix, near Napley Inn Hotel” (Figure 1.2).

Anna had already leafed through a copy of Lonely Planet Haiti. We had bought the guide the day before, and it quickly proved invaluable to find the locations of many points of interest in Port-au-Prince. That book would become the most used Lonely Planet Haiti guide that never made it to Haiti. But there was no mention of “Napley Inn Hotel” anywhere in the guide. Desperate, we posted the following message on Twitter:

Urgent Please RT need address of Un Bon Prix near Napley Inn, people trapped!13

Some time later, we received a reply from a Twitter user, a complete stranger, who said the Napley Inn was actually owned by (and called) the Holiday Inn. With the right name in hand, Anna began her detective work

FIGURE 1.2
Skype message from Search and Rescue team.
anew to find out where in Haiti the Holiday Inn was located. Surprisingly, *Lonely Planet* did not have a listing for the Holiday Inn, so Anna started scouring the satellite images on Google Earth again. The clue, it turned out, was finding the hotel’s pool. There are very, very few swimming pools in Port-au-Prince, and almost all belong to hotels. Now all we had to do was find out which pools belonged to which hotels, and the one left over would be the pool belonging to the Holiday Inn. Anna was now one step closer to finding the exact location of where individuals were reportedly buried under the rubble—or so we thought.

It was now well past 1:00 in the morning, but we still had no idea where *Un Bon Prix* was located, despite Anna finding the orphaned pool. We only had 5 hours left before the search and rescue team was going to fly out with its choppers to those six other locations. So we posted another SOS on Twitter. To our amazement, we received a reply from another complete stranger who had found a curriculum vitae (CV) on the web for a Haitian who used to work at *Un Bon Prix*. She tweeted the link to the CV and suggested we call this person for directions since he now lived in Brooklyn, New York.

So we did, and after a few minutes of broken French and English, I managed to get the driving directions to *Un Bon Prix*. We immediately posted this information in our Skype chat with the SAR team who were still awake and online at the Port-au-Prince airport. Hours later, the team flew to all seven locations. Tragically, they only found survivors at one of the locations.

Some time later, we found out that the right spelling of “Napley Inn” was actually “Napoli Inn.” This was a different hotel altogether, but news reports had confirmed that a young man had been pulled out of the rubble from what was left of the inn. This false lead may explain why we had such a hard time finding any clues about the location of *Un Bon Prix*.

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**PREPARING FOR THE LONG HAUL**

At some point during our digital humanitarian efforts, we received a call from a member of FEMA’s Task Force 3. FEMA is the U.S. Federal Emergency Management Agency, and Task Force 3 had been dispatched to support the relief efforts in Port-au-Prince. The person on the call gave us a quick crash course on how to manage an emergency command center. He
repeated the following several times: “Take shifts and get some counseling support.” At the end of the call, he also pleaded the following: “Whatever anyone tells you, don’t stop mapping.”

While this validated our efforts and felt incredibly rewarding, the pressure that came with the directive was tremendous (although we didn’t realize it at the time). After all, I had only launched this digital humanitarian response as a result of emotional shock—I simply wanted to find a way to help and didn’t have a grand plan. My decision to launch the Haiti Crisis Map was certainly not based on a calculated strategy to help inform official relief efforts in Haiti. What’s more, no one had ever done anything quite like this before. So my friends and I were basically “making it up as we went along,” effectively writing (and rewriting) the how-to book every day.

We eventually relocated our nerve center to a classroom in the basement of The Fletcher School, which we took over and occupied full-time for the rest of the semester. This is where many Haitians from the Diaspora in Boston joined us as digital volunteers. Sabina Carlson, one of the undergraduate volunteers from Tufts who had joined our digital humanitarian efforts, had spent time in Haiti and thus spoke fluent Creole. So she kindly offered to serve as liaison with local communities in Haiti and with the Diaspora in the United States, and quickly sent word of our efforts to her large network. The response was truly heartwarming. A community leader from the Haitian Diaspora in Boston paid us a personal visit in the basement one night to thank us all for our efforts. “We have already sent money and medical supplies to our families and friends back home, but your efforts are allowing us to be even more involved in the response efforts. Thank you for everything you are doing for Haiti. Thank you for caring.”

We were touched by her warmth, kindness, and sincerity. We told her that none of these efforts would be possible without the many Haitian volunteers who were spending countless hours every day and night supporting this digital humanitarian response. There’d be no Haiti Crisis Map were it not for Haitian volunteers. After all, we were certainly not the experts on Haiti, nor did we know any of the streets, let alone neighborhoods. At one point, in fact, a former taxi driver from Port-au-Prince showed up in our command center. He found us quietly hunched over our laptops in the basement very late one night. We explained that we were trying to find the location of streets and other landmarks in downtown Port-au-Prince. He was eager to help. We couldn’t believe our luck and thanked him repeatedly. Later on, one of the security guards who worked the night shift at The Fletcher School would regularly swing by to offer
his help. He too was Haitian, and his knowledge of Port-au-Prince was remarkable. They were the real pros, not us. So we pulled up some extra chairs, showed them how we captured GPS coordinates using Google Earth and OpenStreetMap. They did the rest, applying their local knowledge to aid the relief efforts in their home country.

LAUNCHING AN SMS LIFE LINE

A week after the earthquake, the largest telecommunication company in Haiti, Digicel, launched a free SMS number—4636—that would allow anyone in Haiti to text in their urgent needs directly to the inbox of our crisis map. Days earlier, my colleague Josh Nesbit had posted a tweet saying he was looking for an SMS “gateway” to let Haitians text our Haiti Crisis Map directly.4 One of Josh’s Twitter followers who was living in Cameroon tweeted back, offering to put Josh directly in touch with his colleagues at Digicel Haiti. The SMS system was successfully set up within days thanks to many able colleagues and committed volunteers, including, but not limited to, Ed Jezierski and Nicolas di Tada at the NGO InsTEDD, Rob Munro at Stanford University, and Katie Stanton at the U.S. State Department.

In the meantime, Rob began recruiting English- and Creole-speaking volunteers via Facebook. Why? Because none of us spoke a word of Haitian Creole, and if Haitians were to use the SMS lifeline we were setting up, then we’d be receiving thousands of text messages in Creole, not English. We therefore needed some major help in translating these potentially urgent messages. So another volunteer, Brian Herbert from Ushahidi, took the lead in customizing an existing website so that Haitians could log in to help translate incoming text messages one at a time.5 During the week that followed, tens of thousands of text messages were translated by hundreds of Creole-speaking volunteers in dozens of countries. According to Rob, who coordinated the SMS translation efforts, the average turnaround time between an SMS leaving a cell phone in Haiti and the English translation arriving in the inbox of our crisis map was just 10 minutes.6

When the SMS service was set up, colleagues from the Thomson Reuters Foundation in Haiti announced the service via local community radio stations across Port-au-Prince.7 As had been agreed by all partners, the Reuters team invited Haitians to text their urgent needs along with their
locations to the number 4636. This presented a major challenge, however. We had to be very careful in managing expectations since we couldn’t possibly guarantee a response by official humanitarian organizations. Sabina, the volunteer in charge of liaising with the Haitian community in the United States, reached out to the Diaspora to spread the word and manage expectations. She and I also spent several hours on Haitian Diaspora radio and television explaining how the service worked and being explicit that texting in a need would not guarantee a response. The 4636 number was simply an information service, and humanitarians were doing their best to respond to the most urgent life-and-death messages. It was impossible to be 100% effective in managing expectations, however, which was a constant source of worry for Sabina and I throughout the operation.

That said, and as Rob rightly notes, “All crisis response is an exercise in failure. We cannot help everyone that needs help. . . . To the people we helped it was everything, but in the scale of the whole crisis it was small. However, for a short time in Haiti the ability to respond to requests for help was much wider than at any point in Haiti’s past when even childbirths reported through 4636 were being responded to.”

8 In Boston, digital volunteers identified the most urgent life-and-death SMS’s and prioritized these for mapping. Here are two examples of the translated text messages we received:

My name is [removed for privacy] I’m not dead. I am under the rubbles in University Caraibes, which is in [address removed for privacy]. Please come and get me!

My name is [removed for privacy] my brother is working in Unicef and I live in [address removed for privacy] I have 2 people that is still alive under the building still! Send Help!

While we prioritized these types of messages, we were always falling behind. There were many more text messages than we could possibly triage and map on any given day. By the end of that week, as the search and rescue phase drew to a close, we had identified and mapped about 1,500 individual text messages—that is, about 1% of all the SMS’s received thus far, which was quite the feat given all the challenges. But as noted earlier, this entire effort would have been completely impossible without volunteers from the Haitian Diaspora and beyond.

10 Over 1,000 Creole-speaking volunteers based in over 40 countries translated tens of thousands of messages day and
night for weeks on end. And while we volunteers in Boston didn’t realize it right away given everything that was going on, some of the most avid users of the SMS feed were Haitians in the United States who used the information to coordinate local response efforts on the ground. Soon enough, the mainstream media also caught wind of our efforts: The Haiti Crisis Map was broadcast live on CNN and later featured on the BBC, in The Washington Post and The New York Times, on NPR, and other high-profile news outlets.

The use of SMS changed the entire nature of our digital humanitarian efforts. It was one thing to passively harvest and collect public information from social and mainstream media, but actively requesting information from the disaster-affected population raised a number of serious issues. As mentioned above, were we inevitably raising expectations by soliciting SMS reports despite our best efforts to explain that responses were not guaranteed? Of course, any type of humanitarian intervention raises hopes, but still. There were also serious questions with respect to data privacy and protection. That is, should we be making the content of the text messages public on the crisis map, along with personal names and phone numbers?

My wife, who had just returned from Haiti, posed this privacy question to Louis Aucoin, a renowned professor of law at The Fletcher School who also happened to have deep knowledge of Haiti. He had not encountered a privacy question quite like this before, replying, “I am not sure who would have the expertise on this, but it seems quite clear to me that if you are able to obtain their numbers and they are sending you this information, consent is implied.” To get a second opinion, we posed the same question to legal experts at Harvard University, but they replied much later and weren’t sure either—suggesting that a panel of experts be organized to discuss these issues.

A full 7 days had already passed since the earthquake. This meant that the search and rescue phase was rapidly drawing to a close. If there were any survivors still trapped under the rubble, we had to act fast and wouldn’t have the luxury of setting up an academic seminar or workshop on the topic. So I proceeded to consult several seasoned humanitarian colleagues at the Harvard Humanitarian Initiative for additional guidance. They personally felt that making these SMSs public carried minimal risks—echoing the sentiment expressed by Professor Aucoin, who stated that the situation was indeed “really pretty low risk.” Still, we decided to only publish the most urgent messages—which constituted not more than 1–2% of the SMSs texted to the 4636 number—a decision that remains controversial.
SENDING IN THE CHOPPERS

At one point after the launch of the SMS service, the U.S. Coast Guard contacted us. They wanted to connect on Skype and requested that we copy and paste all actionable and urgent messages with GPS coordinates directly into the dedicated Skype chat. This way, they wouldn’t have to keep refreshing the crisis map every 5 minutes for new reports. Clearly, the digital map was not always the best way to communicate the crisis information we were collecting.

Some time later, we received the following email from the U.S. Marine Corps (USMC):

I am with the US Marine Corps. I am stateside assisting the 22 MEU [Marine Expeditionary Unit] coming off the USS Bataan [on the Haitian Coast]. We want to use your data to bring aid to the people Haiti right now. The USMC is focusing on Leogane, Grand Goave, and Petit Goave. Is there a way to import your data into Google Earth or GIS? We want to make this work for the people of Haiti . . . please let me know ASAP.17

We immediately replied and did everything we could to provide the Marine Corps with urgent and actionable content. The following week, our same contact there sent us the following email, giving us permission later on to share it publicly:

I can not overemphasize to you what the work of the Ushahidi/Haiti [Crisis Map] has provided. It is saving lives every day. I wish I had time to document to you every example, but there are too many and our operation is moving too fast. Here is one from the 22 MEU [Marine Expeditionary Unit]: “We had data on an area outside of Grand Goave needing help. Today, we sent an assessment team out there to validate their needs and everything checked out. While the team was out there, they found two old women and a young girl with serious injuries from the earthquake; one of the women had critical respiratory issues. They were evacuated.”

Your site saved these people’s lives. I say with confidence that there are 100s of these kinds of stories. The Marine Corps is using your project every second of the day to get aid and assistance to the people that need it most. . . . But it is YOUR data and YOUR work that is putting aid and assistance directly on the target and saving lives. Our big gap right now is locating NGOs and where they are working. Your site is helping with that.
Keep up the good work!! You are making the biggest difference of anything I have seen out there in the open source world.18

More disaster responders were now aware of our crowdsourced information service. Indeed, FEMA Administrator Craig Fugate even tweeted a link to the map describing the resource as the most up-to-date and comprehensive information available to the humanitarian community19 (see Figure 1.3). As a result, many international humanitarian responders in Port-au-Prince thought that the volunteers behind the live map were actually on-site in Haiti, which would explain why the map was so detailed and up to date. Many didn’t realize that we were digital humanitarians, with our nerve center located some 1,500 miles north in snowy Boston. Nor did they realize that the bulk of our volunteers were based in dozens of countries around the world.

Groups like the U.S. military, who knew that our operation was conducted entirely online, sent officials to Boston to observe our efforts in person. Indeed, Lt. Gen. H. Steven Blum, the second in command at NORTHCOM, paid us a personal visit and commended all volunteers for their commitment to the relief efforts: “You are doing a remarkable job. We all need to learn from you.”20

OPENSTREETMAP TO THE RESCUE

But this entire effort would have been impossible without hundreds of other digital volunteers from the OpenStreetMap (OSM) community.
OSM is basically the Wikipedia of maps, and its online street map of Port-au-Prince also saved lives in Haiti. The World Bank and the National Oceanic and Atmosphere Administration (NOAA) had teamed up with the Rochester Institute of Technology and other partners to provide OSM volunteers with very high-resolution satellite and aerial imagery of Port-au-Prince. Incredibly, the first batch of satellite imagery was made available to OSM in just 26 hours, which was completely unprecedented at the time—as was the sheer volume of imagery that was openly shared.

What did OSM volunteers do with this huge amount of very high-resolution imagery? They used the OSM website to carefully trace all the roads and small alleyways they could see in the imagery. Volunteers then used old defense agency maps from the 1990s to identify some of the street names for the roads they had just traced. It’s worth noting that many of the digital volunteers who mobilized in support of these efforts after the earthquake had never used OSM before, nor did they know how to trace high-resolution imagery on OSM. This led my colleague Kate Chapman to create a short 3-minute YouTube video that explained how to trace this imagery and thereby support OSM’s digital humanitarian efforts in Haiti. That video was viewed close to 2,000 times, and by the end of the search and rescue phase, more than 1,000 digital volunteers had made over 1.4 million edits to the digital map, making it the most detailed street map of Haiti ever created.

The OSM Haiti map became an absolutely invaluable resource given that the Google Map of Port-au-Prince was incomplete at the time, making the mapping of tweets and text messages very difficult—and at times simply impossible. Indeed, many of the tweets, Facebook updates, and mainstream media reports that were previously unmappable were now mappable thanks to the OSM map. Moreover, OpenStreetMap volunteers didn’t simply map Haiti’s road network. They also mapped the location of hospitals, schools, and dozens of makeshift camps for internally displaced persons (IDPs) as well as other important infrastructure critical to the humanitarian relief efforts.

The OSM map of Haiti made a significant difference to the relief efforts on the ground. The digital map, for example, was uploaded to handheld GPS units used by search and rescue teams on the ground. The map also found its way on to a popular iPhone app, which a number of humanitarian professionals from Europe used extensively. In fact, as my colleague Schuyler Erle noted when he returned from Port-au-Prince, “The entire UN system, all of the UN agencies that were acting on the ground were also using OpenStreetMap for all of their print maps.” OSM’s response to
Haiti remains one of the most awe-inspiring examples of digital humanitarian response to this day.

**POST-DISASTER PHASE**

When the relief efforts drew to a close and shifted to the early recovery and post-disaster phase, we were all burnt out, sleep deprived, and emotionally spent. Reading hundreds or thousands of urgent tweets and text messages day in and day out had become very difficult to handle psychologically. We even had a Creole-English medical dictionary in our situation room because we were getting so many reports of various kinds of injuries, such as head-related traumas. And while these urgent pleas originated from more than a thousand miles away, our ability to communicate directly with affected individuals meant that we were intimately connected to their plight. Recall the advice we’d received from FEMA Task Force 3? Take shifts and get a therapist. We failed miserably at the first part, but not at the second suggestion.

I had invited Maggie Jarmolowski, an experienced trauma counselor based in Boston, to provide pro bono counseling to any volunteers who needed support (like myself). Not only did she join us in the basement to talk about secondary trauma and how to recognize the signs, she also gave us a carefully selected list of self-help guides to help us manage the difficult emotions that some of us were experiencing. In addition, she made herself available via email and Skype to any and all volunteers who needed to talk.

As the relief efforts shifted to post-disaster reconstruction, the question on many of our minds was: “Now what?” Should we “phase out our efforts” and get back to the library to catch up on weeks of missed courses and homework? Or should we apply the skills we had learned to document the reconstruction efforts that would follow? There were growing concerns that the billions of dollars in aid and development money that would inevitably flow into the country would potentially disappear into the hands of corrupt individuals and organizations. There were also the usual concerns around the misuse of funds due to the lack of knowledge regarding actual needs on the ground. One way to add more transparency and accountability to the process might be to map the impact (or lack thereof) of the reconstruction development projects in and outside of Port-au-Prince. That is, we could potentially use the same SMS service
to give Haitians the ability to report directly on the reconstruction efforts and any corruption they witnessed. While the vote on what to do next was certainly not unanimous, the majority of volunteers were keen to extend our efforts to the post-disaster phase.

Since the reconstruction efforts were going to last for years, we needed a way to turn our crisis map into a sustainable “accountability map” of Haiti. We therefore decided to seek out a local partner. As it turns out, my wife had visited a local Haitian software company the day before the earthquake. The company, called Solutions, had been very active in response to the disaster, creating its own digital maps and web-based solutions. We reached out to the Haitian CEO, Kurt Jean-Charles, and spent several months that summer in Port-au-Prince, working entirely pro bono to share everything we had learned about digital humanitarian response along with our software, workflows, best practices, and contacts.

The developer team at Solutions later launched the Noula platform as a result of this collaboration. Today, Solutions continues to partner with humanitarian and development organizations on a number of projects, including several with the local OpenStreetMap community that flourished following the earthquake. Members of this local Haitian OSM community would later become the first digital humanitarian volunteers to respond to the devastating Japanese earthquake and tsunami the following year.

THE HUMAN STORY

The digital humanitarian response to Haiti was unprecedented. And it was definitely far from perfect. The findings published by the one and only independent, professional evaluation of these efforts were mixed. Granted, that assessment was carried out more than a year after the earthquake, “after many months of interviews, sorting through Skype chats and trying to connect the dots.” But still, no one disputes the fact that the Haiti response marked the start of something new. As one independent report later noted, first responders with the U.S. military “found imagery, digital open source maps, and websites that hosted them (such as Ushahidi and OpenStreetMap) to occasionally be of greater value than their own assets.” If anything, our efforts demonstrated a potential, especially given the fact that none of us had done anything quite like this before and that the vast majority of us had no professional humanitarian
experience to speak of. But our familiarity with digital maps, social media, and Skype meant that we were able to crowdsource a live crisis map overnight; the fact that we weren’t part of a bureaucracy certainly helped as well. In addition, we had a lot more time on our hands than our humanitarian colleagues in Haiti, as many of us could simply skip classes (and did in droves) or take time off our day jobs to support the digital humanitarian efforts.

While many media organizations around the world covered our efforts, they typically focused on the technology angle of the story, hyping up the narrative around new technologies. They completely missed the most important part of this story: both digital maps—the OSM and Haiti Crisis Map—would have been completely blank, completely devoid of information, were it not for the thousands of digital volunteers who cared—the vast majority of them Haitians. Every point that was added to those digital maps, every edit that was made, was the result of a human being who took the time to collect and map that information. Every single need that was mapped, every damage report, street corner, IDP camp, etc., was manually and often laboriously added by volunteers who cared.

If people hadn’t cared, those digital maps would have been blank. But people cared and mobilized online. These “digital Samaritans” spent hours, some even days and weeks of their own time, to help others thousands of miles away, to help people they would never meet. Why? Because it was the right thing to do, because they could, because helping others during tragedies is what makes us human. Until recently, when disasters struck in faraway lands, we would watch the news on television and wish we could somehow help. That private wish, that innate human emotion, would perhaps translate into a private financial donation, and this gesture, more often than not, never felt like enough. But that was it. There wasn’t much more we could do. We were simply too far away, too geographically removed, to provide any additional, meaningful support to those affected by the disaster.

Like many other friends, I felt utterly powerless and overwhelmed when CNN broke the news on the Haiti earthquake. But today we can translate these initial, private human emotions into action, into public collective action online. Indeed, not only can we donate money to support relief efforts, but we can also donate our time to support rescue efforts even while we’re on a bus commuting to work on the other side of the planet. All we need is Internet access. So if you can click “Like” on a Facebook
status update, then you too can be a digital humanitarian and make a meaningful difference.

So the next time you feel disillusioned about humanity and perhaps feel like you’re losing faith in our species, have a look at those digital maps of Haiti (and the dozen other crisis maps that digital humanitarians have launched since). Hopefully you’ll see what I see: not dots on a map, but direct, tangible evidence that people care—and when given the means, they can translate this care into action. Global goodwill is real; we simply need to connect the dots and channel this action toward positive social goals.

The Haiti story is, without doubt, just as much a human story as it is a story about new technologies. Come to think of it, these technologies actually make us more human. Technology need not be dehumanizing. As digital humanitarians in Haiti ably demonstrated, these new connection technologies can extend and amplify our humanity, can translate our initial private emotions of sadness and powerlessness into public—indeed global—action to help others thousands of miles away.

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**DOING BATTLE WITH BIG DATA**

We were constantly overwhelmed with the vast amount of information that needed to be monitored and processed—from Twitter, Facebook, and YouTube, to mainstream news, television reports, radio broadcasts, emails, and SMS. In fact, we were always behind and were never able to catch up, especially when the text messages from Haiti started hitting our inbox. As it turns out, more than 2 million tweets with the word Haiti or Red Cross were posted within 48 hours of the earthquake. At one point, Digicel had kindly offered to send out a “blast” SMS to all its mobile phone subscribers (over 1.4 million people) to alert them of our SMS service and crisis mapping efforts. We politely declined, as we could barely keep up with the triaging of just a few thousand text messages a day.

While we kept training new volunteers on a daily basis, there remained a rapidly growing backlog of hundreds of thousands of unread tweets, text messages, emails, and more in our inbox. These were never read, never triaged, never mapped. While we didn’t know it at the time, what we had just experienced was our first battle with Big Data—with Big Crisis Data. The lesson was clear: an overflow of information and data can be as paralyzing as the absence of it when it comes to mobilizing disaster response efforts.
RISE OF DIGITAL HUMANITARIANS

This book charts the sudden rise of digital humanitarians from the 2010 Haiti earthquake onward, including the Ebola outbreak in West Africa. The following chapters describe how new digital sources of information from social media to high-resolution satellite imagery, and new platforms powered by advanced computing are catapulting digital humanitarians forward and defining the future of disaster response. Each chapter that follows draws on real-world stories of digital humanitarians in action; short stories that are as awe-inspiring as the digital humanitarian response to the Haiti earthquake. Chapter 2 introduces the notion of Big (Crisis) Data and addresses concerns around the use of Big Data for humanitarian response. These include data bias, discrimination, false data, and threats to privacy. The chapter draws on several stories to explain why two of the main challenges for the future of digital humanitarian response are Big (Size) Data and Big (False) Data. As such, the first two chapters of the book set the stage for the main stories that follow. The first half of the book weaves in stories about how digital humanitarians are dealing with Big (Crisis) Data while the second half charts their efforts to verify Big (False) Data.

Chapter 3 begins with the digital humanitarian response to the Russian fires of 2010, highlighting how crowdsourcing was used to catalyze citizen-based disaster response efforts both online and offline. The chapter then describes the launch of one of the first-ever global networks of digital humanitarian volunteers—a group called the Standby Volunteer Task Force (SBTF). The chapter depicts how the SBTF partnered with the United Nations (UN) in response to the Libya crisis. As a result of these efforts, the UN co-founded and launched the Digital Humanitarian Network (DHN). Today, the DHN serves as the official interface between established humanitarian organizations and the growing number of digital volunteer networks. Chapter 3 describes how digital humanitarian volunteers subsequently adopted a smarter crowdsourcing approach—called crowd computing or microtasking—to make sense of Big Data during disasters. The chapter highlights how the Digital Humanitarian Network used this approach to support the UN’s humanitarian relief efforts in response to Typhoons in the Philippines.

Chapter 4 considers the application of microtasking to satellite imagery. The chapter begins with the crowdsearching efforts for a Malaysian Airlines flight that went missing in 2014. While the scale of the crowdsearch
was certainly unprecedented, the use of microtasking to analyze satellite imagery is hardly new. Chapter 4 recounts how the SBTF partnered with the UN Refugee Agency to estimate the number of Somalis who had been displaced due to drought and violence. The chapter then turns to Zooniverse, a highly successful citizen science microtasking platform, and describes an exciting new project that applies microtasking wizardry to analyze satellite imagery captured—in record time—by a new generation of satellites. The chapter then turns to aerial imagery captured using civilian unmanned aerial vehicles (UAVs), i.e., small, nonlethal drones. A number of novel UAV projects following typhoons in the Philippines are highlighted along with new microtasking efforts to analyze aerial imagery.

Chapter 5 returns to social media as a source of Big Data and explains why microtasking alone may only be part of the solution. The chapter introduces concepts from advanced computing and artificial intelligence—such as data mining and machine learning—to explain how these are already being used to make sense of Big Data during disasters. The chapter highlights how digital humanitarians have been using these new techniques in response to the crisis in Syria since 2011. We also visit the American Red Cross’s Digital Operations Center following the massive tornado that tore through Oklahoma in 2013. Chapter 5 then follows the actions of digital humanitarians just minutes after a large earthquake struck Chile in early 2014. The chapter concludes by highlighting how methods from artificial intelligence are also being used to make sense of vast volumes of text messages (SMS) for humanitarian, development, and public health projects.

Chapter 6 extends the use of artificial intelligence and machine learning to the world of satellite and aerial imagery. Like previous chapters, Chapter 6 draws on real-world humanitarian efforts to demonstrate—in nontechnical language—the use of automated satellite imagery analysis for disaster response. The chapter draws on examples from Haiti and the Philippines to describe the latest breakthroughs in automated imagery analysis. The chapter then highlights how these automated techniques are also being applied to rapidly analyze aerial imagery captured by UAVs. Again, real-world examples are presented using nontechnical terms.

Chapter 7 begins to tackle the challenge of Big (False) Data—that is, misinformation and disinformation generated on social media during disasters. The chapter opens with the verification challenges that digital humanitarians faced in Libya and during elections in Russia. Chapter 7 then outlines concrete strategies for the verification of social media by
drawing on the digital detective work of a seasoned investigative journalist during the Arab Spring. The chapter also highlights how Skype was used in Kyrgyzstan to crowdsource the verification of rumors in real-time during a period of acute violence. Next, Chapter 7 highlights the most effective strategies used by BBC journalists to verify user-generated content. The chapter then considers the use of time-critical crowdsourcing to verify social media during disasters, highlighting a novel and promising new project inspired by the search for red weather balloons.

Chapter 8 highlights how artificial intelligence and machine learning can be used to verify user-generated content posted on social media during disasters. The chapter makes a case for combining traditional investigative journalism strategies with new technologies powered by artificial intelligence. To outline the role that artificial intelligence and machine learning can play in the verification process, the chapter draws on a unique study of noncredible tweets posted during an earthquake in Chile. Results from this and subsequent studies demonstrate that the credibility of tweets can be predicted. Related studies that focus on terrorist attacks and a dozen other high-profile events confirm that both fake tweets and images can be automatically identified with a relatively high level of accuracy. The chapter concludes with an overview of a new project that enables anyone to automatically compute the credibility of tweets.

Chapter 9 considers a different take on digital humanitarians by highlighting how their efforts turn to digital activism in countries under repressive rule. The chapter provides an intimate view into the activities of digital humanitarians in the run-up to the Egyptian revolution and during the Libyan crisis, demonstrating how digital activists in Egypt crowdsourced citizen-based humanitarian convoys into Tripoli. The chapter then highlights how digital activists from China and Iran are drawing on civil resistance strategies when responding to disasters. The chapter concludes by suggesting that crowdsourced humanitarian response improves nonviolent civil resistance, and vice versa.

The final chapter of the book begins by distilling some of the lessons that digital humanitarians ought to learn from digital activists in repressive countries. These lessons and best practices highlight the importance of having innovative policies in place and not just innovative technologies. The importance of developing forward-thinking policy solutions pervades the concluding chapter, from the use of cell phone data to assess the total number of individuals affected by a disaster, to democratizing humanitarian technology by using spam filters and massive multiplayer
online games. Technology alone won’t solve the myriad challenges that
digital humanitarians face. Enlightened leadership and forward-thinking
policy making are equally—if not more important than—breakthroughs
in advanced computing. The chapter concludes by highlighting key trends
that are likely to define the next generation of digital volunteers.

THIS BOOK AND YOU

This book—which is ultimately about hope, agency, and positive social
change—does not assume or require any prior technical knowledge. I sim-
ply share a series of short stories about digital humanitarians in action like
the one on Haiti. But the story of digital humanitarians does not end with
the last chapter of this book. You’ll find me continuing the stories on my
iRevolution.net blog, where I welcome your comments along with your
own stories of digital humanitarians in action. I am also continuing the
story on Twitter (@patrickmeier), where I welcome your thoughts on how
we can improve our collective online efforts now and in the years ahead.

It seems like every day brings a new slate of headlines describing how
social media and related digital technologies are being used to cause harm
or violate our privacy, be they about repressive regimes arresting social
media users for their outspoken criticisms, or reports of Western democ-
racries spying outright on their own citizens’ digital communications. This
book presents an alternative narrative, another possible world that already
exists—one in which we use new technologies to help each other during
disasters. Just imagine: if a bunch of students were able to create a live cri-
sis map of Haiti and help save hundreds of lives without ever setting foot
in the country, then you too can make a difference. Just be sure to avoid
making the mistakes we made! Reading this book will help.

In any event, you can support digital humanitarian efforts while reading
this book. Check out Digital-Humanitarians.com for the latest volunteer
opportunities. We’ll need your help when the next disaster strikes; even
if you only have a few minutes, trust me, this will go a long way, espe-
cially if you invite your friends along. No super powers or prior experience
needed. As long as you can get online, you can be a digital humanitarian.

There are also plenty of other ways you can make a difference. You can
grow this movement of digital humanitarians by sharing their stories
far and wide. Want to give a talk on one or more of the chapters in this
book? Then feel free to use my slides and videos posted on iRevolution.net/Book. If you’re a student, consider creating your own crack team of digital humanitarians at your school or university. If you’re a teacher or professor, why not give a course on humanitarian technology and digital humanitarian response? Invite your students to write their research papers on the subject. For humanitarian professionals and emergency management experts, chances are that the humanitarian technologies and digital strategies described in the following chapters are completely new to your organizations. This book gives you an easy way to introduce these new technologies and innovative ideas internally. Use the insights and lessons learned from the following chapters to drive innovation in your own organizations. And if I can be of any service, simply get in touch with me at any time via iRevolution.net.