

Workshop on Using Aerial and Social Media Images for Humanitarian Aid

Speakers' Talks & Bios



Dr. Devis Tuia

Professor

Wageningen University & Research

Title: Digital animal conservation: using drones and machine learning to manage wildlife reserves

Abstract: Managing wildlife reserves requires precise estimations of livestock, in order to understand their foraging behavior and movements. This has implications on species protection (typically from poachers), reintroduction and on the availability of food. Identifying and counting animals has traditionally been carried out manually, based on data issued from camera traps, transects counting or helicopter flights. The use of drones offers a safe, easily repeatable and inexpensive way of carrying livestock counting. But to make the image acquired usable, advanced image recognition models must be developed to detect and characterize single animals, therefore leading to a precise estimation of the current population. In this talk I will present how technological advances in crowdsourcing and deep learning can be put to the service of animal conservation to ease the workload of rangers and provide accurate and safe livestock estimations.

Bio: Devis Tuia received the Ph.D in environmental sciences at the University of Lausanne, Switzerland, in 2009. He was a Postdoc at the University of València, the University of Colorado, Boulder (CO) and EPFL Lausanne. Between 2014 and 2017, he was Assistant Professor at the University of Zurich. He is now Associate Professor at the GeoInformation Science and Remote Sensing Laboratory at Wageningen University, the Netherlands. He is interested in algorithms for information extraction and data fusion of geospatial data (including remote sensing) using machine learning and computer vision.



Dr. Doina Caragea

Professor

Kansas State University

Title: Collecting, processing and analyzing crisis data to enhance situational awareness

Abstract: Disaster-affected communities are increasingly becoming the source of big (crisis) data during and following major disasters. At the same time, big data have the potential to become an integral source of information for response organizations, as they can help enhance the situational awareness and facilitate faster response where is most needed. Despite such benefits, the challenges presented by big data preclude organizations from using them routinely. Manually sifting through voluminous streaming data to filter useful information in real time is inherently impossible. We study machine learning solutions to help emergency response organizations deal with the overload of

relevant and trustworthy information, in real time, to improve situational awareness. As an example, we have proposed a novel approach, based on convolutional neural networks and class activation maps, to locate damage in disaster images and to quantify the degree of the damage. Our proposed machine learning solutions, which enable the use of multimodal social network data, have the potential to transform the way in which crisis response organizations operate, and, in turn, to provide better support to the victims of disasters in a timely fashion.

Bio: Doina Caragea, Ph.D., is a Professor at Kansas State University. Her research and teaching interests are in the areas of machine learning, data mining, data science, information retrieval and text mining, with applications to crisis informatics, security informatics, recommender systems, and bioinformatics. Her projects build upon close collaborations with social scientists, security experts and life scientists, and aim to provide practical computational approaches to address real-world challenges. Dr. D. Caragea received her PhD in Computer Science from Iowa State University in August 2004, and was honored with the Iowa State University Research Excellence Award for her work. She has published more than 100 refereed conference and journal articles. Her research has been supported by several NSF grants. Dr. Caragea is a member of the Association for Computing Machinery (ACM), and the faculty advisor for the local chapter of the ACM-W (Women in Computing).



Elliot McBride

Data Scientist

The Centre for Humanitarian Data, UN OCHA

Title: Being data prepared - The standardization of data for emergencies

Abstract: We will be outlining the standard of data reporting during a crisis and how social media is filling the void whilst displaying a need for emergency data to be standardized. Elliot will also highlight OCHA's role in using social media to reach users and what the future looks like for the standardizing of humanitarian data using the language – HXL, a simple standard for messy data.

Bio: Elliot has spent 3 years in Pakistan with UNICEF implementing innovations to assist field programmes, he has then spent 1 year in Copenhagen with UNICEF's Global Innovation Center before moving to OCHA with HDX. His passions include visualizing data for communication, triathlons and basketball. He is currently living in London.



Faine Greenwood

Researcher

Harvard Humanitarian Initiative

Title: Ethical and operational challenges in collecting humanitarian UAV data

Abstract: Using UAVs during humanitarian disasters invites novel operational and ethical challenges. Humanitarian must balance technical accomplishment in humanitarian UAV use with operational and ethical clarity. This presentation will focus on these questions: How should UAVs be integrated into

airspace during disaster, especially in complex emergencies and in conflict? How could UAV-collected imagery be used to violate the privacy and safety of people affected by disaster - and how can humanitarians reduce the risk of these violations happening? How do people affected by disaster interact with and respond to UAVs and the imagery they collect, and how might we better achieve community buy-in? What research needs to take place to adequately answer these questions?

Bio: Faine Greenwood is an assistant researcher at the Harvard Humanitarian Initiative, focusing on how UAV and satellite technology can be used in humanitarian contexts. A graduate of Stanford University and Tulane University, Greenwood is a former Southeast Asia correspondent and a recreational drone pilot.



Dr. Manuel Fiol

Fellow Research Associate

UNITAR's Operational Satellite Applications Programme (UNOSAT)

Title: New technologies for the safeguarding of cultural heritage

Abstract: We will present a summary of our recent work in the Ancient City of Aleppo and Syria in regards to Cultural Heritage Protection and the development of Augmented Reality application to enhance the understanding of the damage extend to many of the cultural heritage sites in Syria. In addition, I will be presenting examples of our most recent work that we did to assess the status of cultural heritage sites in Papua New Guinie and Tonga using satellite and drone imagery.

Bio: Dr. Manuel Fiol received his certificate in Geography and Remote Sensing from the National Geospatial Intelligence College of Virginia in 2005. He currently develops and manages cultural heritage protection, and human security monitoring at the UN Institute for Training and Research (UNITAR) Operational Satellite Applications Programme (UNOSAT). He started in this capacity in May 2013 and previously was a Senior Imagery Analyst at the National Geospatial-Intelligence Agency in Virginia, USA. He has extensive experience managing projects that apply remote sensing, satellite imagery, GIS, and related tools for large-scale human security monitoring.



Per Aarvik

President

Standby Task Force

Title: Aerial imagery and crowdsourced analysis – Two approaches from the Caribbean hurricane season 2017

Abstract: In 2017, hurricane Maria devastated several islands in the Caribbean. Among them were Dominica and Puerto Rico, where SBTF was engaged to do analysis of aerial imagery for the purpose of damage assessment. Two cases will be presented as examples of different approaches to the use of crowds either as “informers” on social media, or as “processors” as online volunteers. Both approaches have their advantages and challenges. Both projects were handled by humans rather than machines.

Bio: Per has a decade-long history with crowdsourcing and online volunteering, the last 6 years with the Standby Task Force (SBTF). This volunteer network was established after the Haiti earthquake in 2010 and provides a variety of crisis intelligence during disasters. Per has been on the Core Team since 2013, and held the title of president since 2016. He has conducted and participated in a number of humanitarian crowdsourcing projects both under the SBTF umbrella and in other contexts. His MA thesis (continuous education, 2015) was written on the crowdsourced election monitoring in Kenya 2013. With irregular intervals, he is lecturing online or on-site on civil society's online engagements for meaningful purposes. He has an affiliation with Christian Michelsen's Institute (cmi.no) in Bergen, Norway.



Dr. Robin Murphy

Professor
Texas A&M University

Title: The role of robots during the response phase of a disaster

Abstract: Ground, aerial, and marine unmanned systems can assist emergency managements with lifesaving and disaster mitigation activities after a disaster. This formal response phase is different in terms of activities, operations tempo, regulations and public accountability from the recovery and humanitarian relief phases. This talk will discuss the timeline of disasters and the ramifications for robotics. It will illustrate the missions and how they change over time using the extensive datasets of the use of small unmanned aerial vehicles for Hurricanes Harvey and Irma.

Bio: Robin Murphy is the Raytheon Professor of Computer Science and Engineering at Texas A&M University and is a director of the Center for Robot-Assisted Search and Rescue. She helped found the fields of disaster robotics and human-robot interaction, concentrating on developing human-centered AI for ground, air, and marine robots. Her work is captured in over 150 scientific publications including the award-winning Disaster Robotics and a TED talk. Murphy has deployed robots to over 27 disasters in five countries including the 9/11 World Trade Center, Hurricane Katrina, Fukushima, the Syrian boat refugee crisis, and Hurricane Harvey. Murphy's contributions to disaster robotics have been recognized with the ACM Eugene L. Lawler Award for Humanitarian Contributions, the AUVSI Foundation's AI Aube Award, and the Motohiro Kiso Award for Rescue Engineering Education.



Wim Zwijnenburg

Project Leader
Peace Organization PAX

Title: Rapid identification and monitoring of conflict pollution using open source investigation methods to improve humanitarian response

Abstract: Environmental damage caused by armed conflict could pose acute and chronic health risks to affected communities. From the use of the toxic Agent Orange in Vietnam to the burning oil wells set on fire by the so-called Islamic State in Iraq, the consequences of these hazardous war remnants are

often not recorded or monitored. With the abundance of smartphone, internet access and freely accessible remote sensing options, civil society organizations have been working to identify, document and monitor the impacts of conflict on the environment and their potential human health consequences. This presentation will take you through a brief tour of how PAX has assembled and applied a range of online tools and techniques to monitor conflicts, provide the information to relevant actors and ensured the findings were included in humanitarian response and advocacy initiatives at the UN level. We would also want to engage on potential tools and opportunities for collaboration and see where we can improve our work and support others.

Bio: Wim is a Project Leader on Humanitarian Disarmament for the Dutch NGO PAX. He has worked extensively on conflict and environmental issues in the Middle East since 2011. He specializes in data collection and identification of conflict-related pollution and improving humanitarian response, in particular on Iraq, Syria and Yemen, and written numerous research report and publications on this subject. PAX received the UNEP/OCHA 2017 Green Star Award for their work on environment in conflict settings and their work on advocacy on this topic. Wim also works on emerging military technologies as coordinator of the European Forum on Armed Drones and is a contributor to the Bellingcat open-source journalism collective.