

## Sky and the Social Eye: Enriching Remote-Sensed Events

### Overview

Satellite images have been used to explore environmental and social challenges for decades. NASA's longest running satellite program is Landsat, which in its 40-year history has been used to: identify the extent of forest fires, map land use change, assess carbon stock and analyse reef water quality (<http://landsat.gsfc.nasa.gov/?p=3501>). In 2008, NASA made the Landsat archive available free of charge, with images from the latest Landsat satellite (Landsat 8) now available from Amazon Web Services.

The advantage of satellite images is that they provide a large spatiotemporal area which can provide strong and compelling evidence of events. This allows analysis of satellite images to be applied at multiple scales, from local disturbances to studies at the regional, national and global scale. Despite the usefulness of satellite images, they often have a relatively low temporal frequency (for example: every fortnight) and only tell part of the story. We would like to combine satellite images with social media (e.g. twitter, flicker etc.) and news items which report events in real time and tell a much broader story.

### Task

This aim of this task is to build a system that links social multimedia to events that can be detected in satellite images. Consider, for instance, linking an event such as a forest fire or cyclone, to media reports, Instagram, Flickr, Twitter, web pages, Wikipedia, etc.

You will need to:

- 1) Identify which events you like to focus on;
- 2) Identify when those events occurred;
- 3) Design and develop a tool to retrieve social media regarding that event;
- 4) Design and develop a system to tie together the social media and satellite images;

You may use any datasets linked to events of your choosing. Some potential datasets and events are listed below.

### Evaluation metric

Participants will give a multimedia presentation or demonstration of their system during the Grand Challenge session at ACM Multimedia 2016. Organizers will choose winning systems based on:

- Quality of demonstration
- Interestingness
- Technical contribution
- Scalability

## Datasets

Participants may use any dataset that they choose. However, two participant datasets are the Landsat 8 dataset, which contains satellite imagery from NASA's Landsat 8 satellite, and the and the YFCC100M dataset which contains approximately 99 million photos and 1 million videos and made available by the Multimedia Commons Initiative. Both of these datasets are available on Amazon Web Services.

Landsat 8: <https://aws.amazon.com/public-data-sets/landsat/>

YFCC100M: <https://aws.amazon.com/public-data-sets/multimedia-commons/>

## Events

Participants may choose any events that wish to cover, however, the event should be significant and require the combination of satellite and social media. The event can either have social or environmental significance, be on a local or wider scale and can be one-off or continuing. Some significant social and environmental events that occurred since Landsat 8 has been operation are listed below and may be used by participants. The events are listed in no particular order.

### Impact on Fiji from Cyclone Winston

Timeframe February 2016 Latitude: 17-18 S Longitude: 177-179 E

In February 2016 Cyclone Winston made landfall on Fiji. It was the largest cyclone ever to make landfill on Fiji. It caused the death of 44 people, damaged or destroyed 25,000 homes and impacted approximately 350,000 people (40% of Fiji's population).

### Bento Rodrigues Dam Disaster, Brazil

Timeframe November 2015 Latitude: 20 S Longitude: 43 W

On November 5 2015 the Funado iron ore tailings dam in Bento Rodrigues, Mariana, Brazil suffered a catastrophic failure, which lead to 60 million cubic meters of water and waste flowing into the Doce River. The flowing water caused flooding the town of the Bento Rodrigues and caused 17 deaths. The flood water reached the Atlantic Ocean 17 days later.

### Growth of the Zaatari Refugee Camp, Jordon

Timeframe 2013- 2015 Latitude: 32 S Longitude: 36 E

The Zaatari refugee camp was built in response to the refugee crisis in Syria. From its opening in 2012 it has grown into the 5th largest city in Jordon. While originally designed to hold up to 60,000 people it has held up to 300,000 people. Currently its population stands at 80,000 people.

## 2015 Californian Wildfires

Timeframe 2015 Latitude: 36 N Longitude: 119 W

The 2015 California wildfires were a series of wildfires that burned across the state of California during 2015. Overall, an area of 307,598 acres was burnt. 9 people were killed in the fires, including 7 civilians.

## Rebuilding of areas surrounding the Fukushima Daiichi Nuclear Plant, Japan

Timeframe 2013-2015 Latitude: 37 N Longitude: 141 E

On March 12 2011 the Fukushima Daiichi Nuclear Plant suffered 3 nuclear meltdowns following the Tōhoku earthquake and tsunami on the previous day. It was the largest nuclear disaster in 25 years and the second to be given a Level 7 event classification of the International Nuclear Event Scale (after Chernobyl). About 200,000 people were displaced due to mandatory and recommended evictions.

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