Responding to the flood emergency in Germany with the use of high tech from the space

Gina M. Schwendemann

UN-SPIDER Conference for regional experts of Africa
Munich, 16th Nov. 2021
North Rhine-Westphalia and Rhineland-Palatine
Accumulated water from Tuesday till Thursday morning will be from 80-180/200 l/m².

Floods happened in the night on 14th July 2021
Friday July, 16th 2021

29 Employees
10 (aircrew), approx. 5 parallel in ZKI (total 13), 6 in Operation Service
Water level

6 m

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Flying hours
24 (utility craft), 17 (Helicopter), 7 (light aircraft)

Delivered Data
~ 600 GB
Software learnt and think like humans

Algorithm learnt without explizit being Programmed

Artificial neural network learnt from big amount of data
var classifyWater = function(img) {
    var vv = img.select('VV_Filtered');
    var water = vv.lt(-16).rename('Water');  // Identify all pixels below threshold and set them equal to 1.
    water = water.updateMask(water);  // All other pixels set to 0
    water = water.updateMask(water);  // Remove all pixels equal to 0

    return water;
}
Flood detection by means of Machine learning based on Sentinel-1 (SAR image), 10 m resolution on July, 16th 2021

Aerial photography mosaic of Erftstadt as of Friday, 16th and Sunday, 18th July 2021, RGB, 0.15 m resolution

Raw output of flood detection by means of Deep learning
Artificial intelligence

Machine learning

Deep learning

Software learnt and think like humans

Algorithm learnt without explizit being Programmed

Artificial neural network learnt from big amount of data
CNN – Convolutional Neuronal Network
Deep learning in the everyday work
Deep learning in the everyday work
Aerial photography mosaic

Raw output of flood detection by means of Deep learning
Raw output of flood detection by means of Deep learning

Results after post-processing
11 years helping countries around the world in emergency response

Germany's flood emergency in July in Numbers:

Maps 26

Images ~ 40,000
Spacex \textit{internet} Mobile power supply

Emergency generator

Mobile power supply
200 ha

Water depth gauge in Ahr

Assumed high level in the night of 14th July to 15th July 2021
Water level measurement broke off
Historical high water level is exceeded June, 2nd 2016


Grafik: SWRdata • Quelle: Hochwasserzentrale RP • Daten

56,000 Inhabitants
17,000 Lost their posessions

www.swr.de

4,200 Buildings
3,000 Damaged buildings
467 Destroyed buildings
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gina.schwendemann@dlr.de

zki@dlr.de