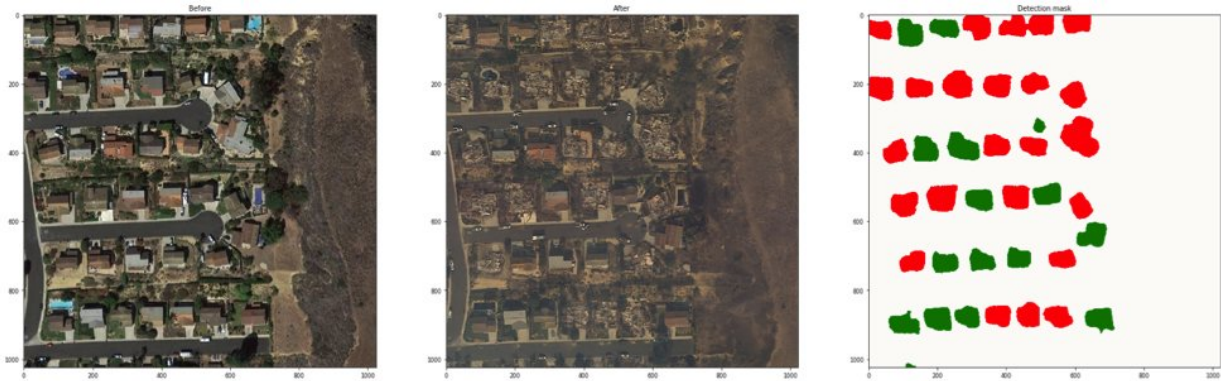


Neural network trained to assess fire effects

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Credit: Open Data Program: DigitalGlobe

Skoltech's Aeronet Lab has developed an algorithm that makes it possible to analyze satellite images of areas affected by fires and other natural disasters and to make a quick assessment of the economic damage. The algorithm is based on machine learning and computer vision.

The AeroNet Lab at Skoltech's Center for Computational and Data-Intensive Science and Engineering (CDISE), in collaboration with Professor Evgeny Burnayev, trained the [neural network](#) on sets of satellite images to ensure that it can distinguish between the buildings destroyed from those untouched by fire. To train the neural network, the scientists used publicly available [satellite images](#) of California (United States) taken in 2017. Later, the trained network reliably identified burnt-

out houses in the test area, Santa Rosa (California), which was affected by destructive fires. If used in a crisis environment, the solution helps to quickly assess the scope of the disaster and the expected damage and expedite the [decision making process](#). The project has spurred interest among public and humanitarian organizations, as well as insurance companies.

"The developed algorithms are capable of analyzing multi-temporal satellite image series and detecting changes in objects belonging to a certain class. The solution will be a great help in various research tasks and industrial area-monitoring applications, such as the detection of new construction sites, a population density assessment, and risk management in protected areas," says Vladimir Ignatiev, a research scientist at Skoltech.

AeroNet Lab develops various applications based on deep learning and computer vision to deal with a host of real-world issues using [satellite](#) and aerial imagery: monitoring services for security zones of large-scale industrial facilities, such as pipelines and [high-voltage power lines](#) (leak detection, overgrowth control, illegal construction, etc.), recommender services for purposes of geomarketing (building height and occupancy assessment, etc.), forestry and agriculture (illegal felling, standing timber quality, crop yield forecasting, consequences of droughts).

More information: Trekin, Alexey, German Novikov, Georgy Potapov, Vladimir Ignatiev, and Evgeny Burnaev. "Satellite Imagery Analysis for Operational Damage Assessment in Emergency Situations." arXiv:1803.00397 [Cs], February 19, 2018. arxiv.org/abs/1803.00397

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