

Using Satellite Images to Identify Damage

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Austin, TX

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New Light
Technologies



Partners

**“Helping People, before,
during and after disasters” -
FEMA**



**“... is solution to the global
skills gap.”**
- Jake Schwartz CEO
General Assembly



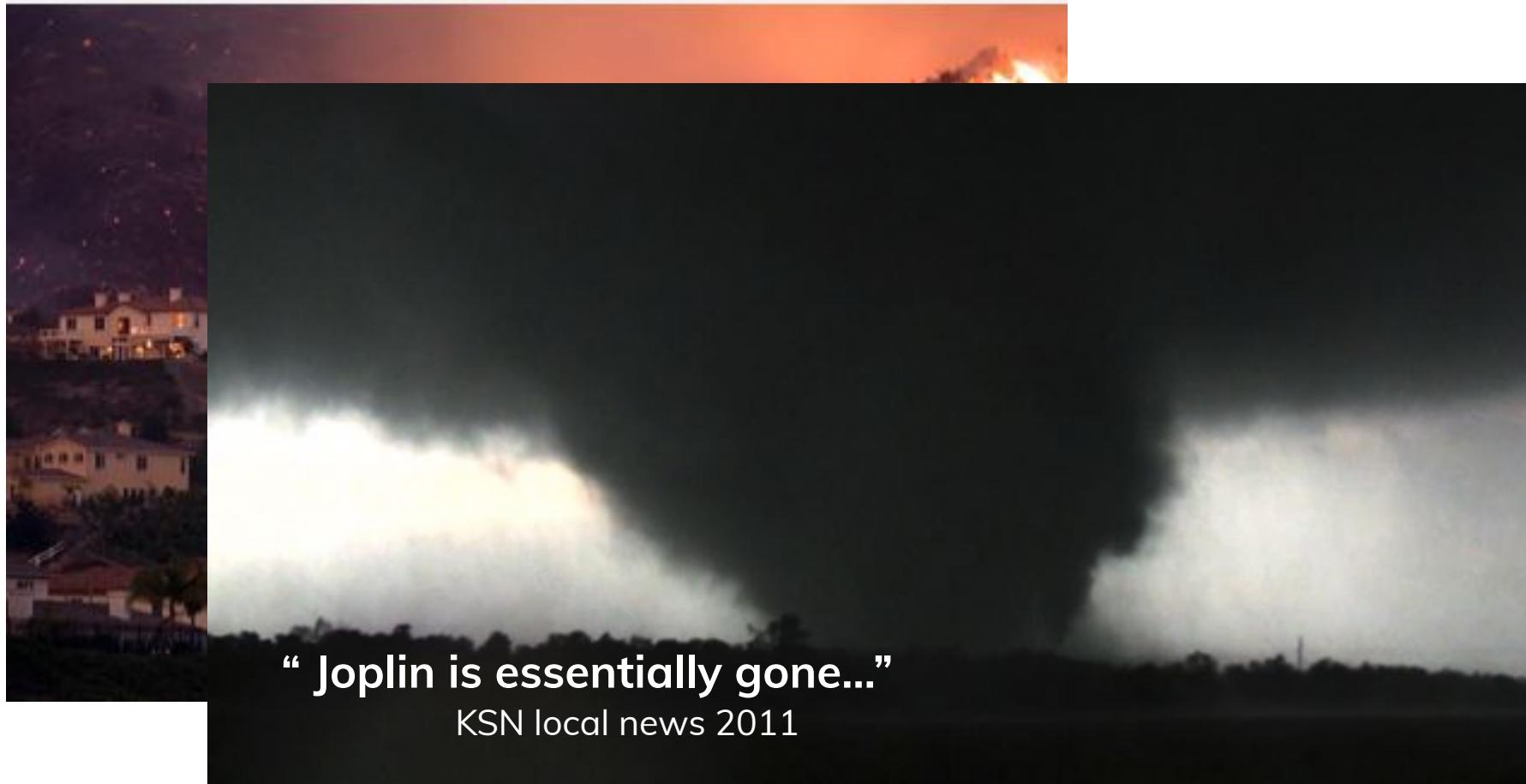
**“Building predictive
analytics that power the
nation’s federal disaster
response.”**
- New Light Technologies





“California is burning.”

Los Angeles Times 2018



“ Joplin is essentially gone...”
KSN local news 2011



**“ ...USDA estimates 6 million acres
too wet to plant...”**

Evansville, IN 2019



Problem Statement

Disasters are chaotic. Immediate needs are the search and rescue of survivors.

Knowing how big of an area has been affected is critical to sending necessary resources quickly to where they are needed most.

We will distinguish affected disaster areas from satellite images.



The Camp Fire as seen from the Landsat 8 satellite on November 8, 2018

Agenda

- ◀ Introduction
- ◀ Image Selection
- ◀ Image Transformation
- ◀ Object Detection
- ◀ Next Steps

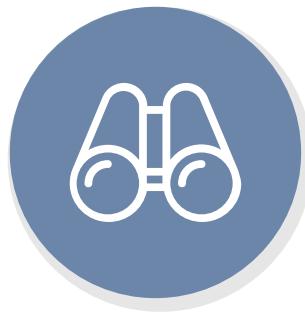
Image Selection

Drannen Love



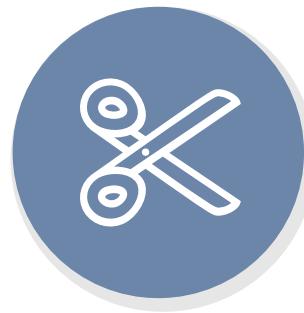
Image Selection Process

Finding all the pretty pictures...



Search

Before and After
images



Modify

Format and
Resize



Evaluate

SSIM score



Aerial



Satellite

Image Quality Scores

SSIM: Structural Similarity Index

An objective quality measurement used for measuring the similarity between two images - a reference image and a processed image.

We were able to **repurpose** the use of the SSIM score to compare the before and after photos.

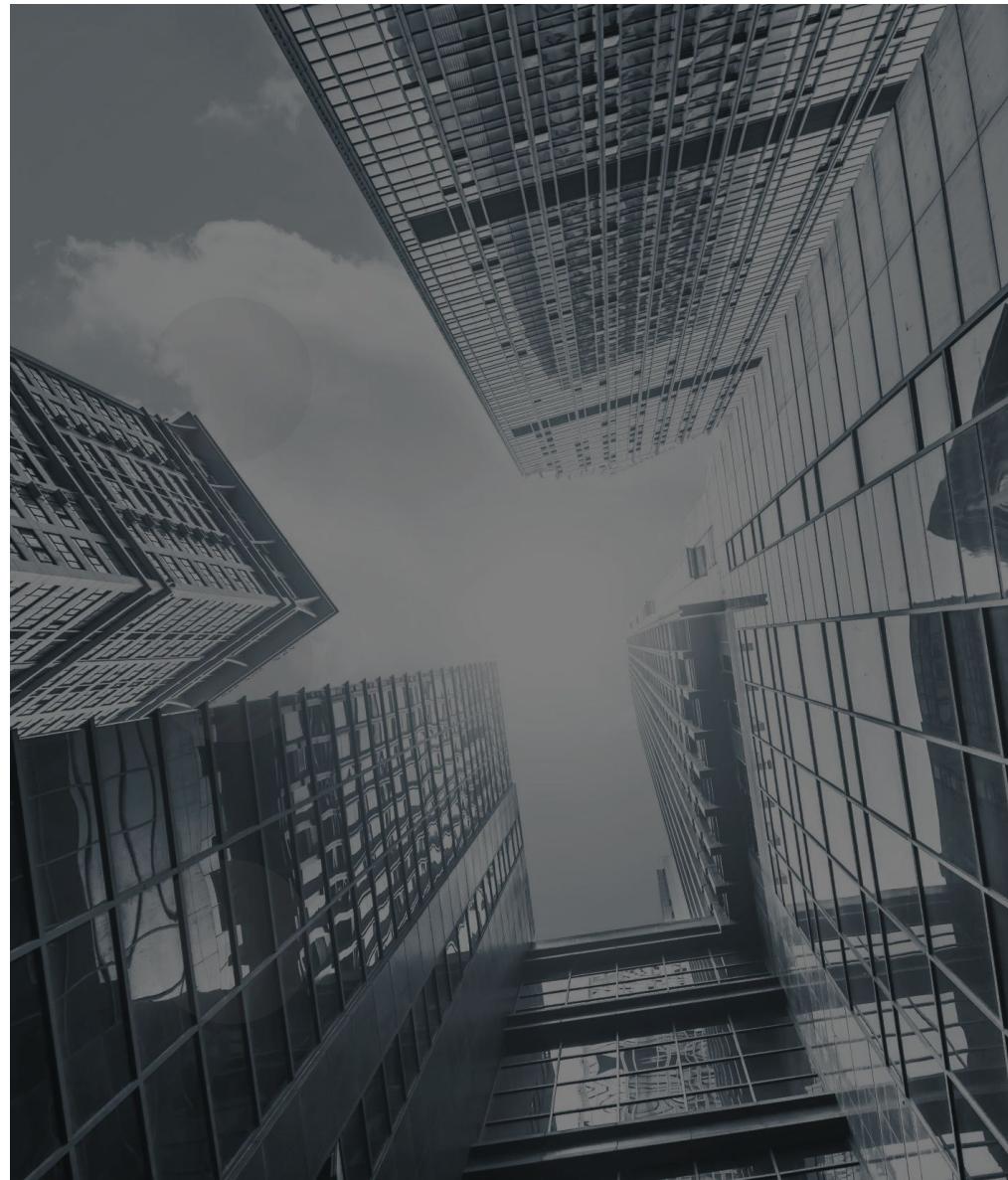


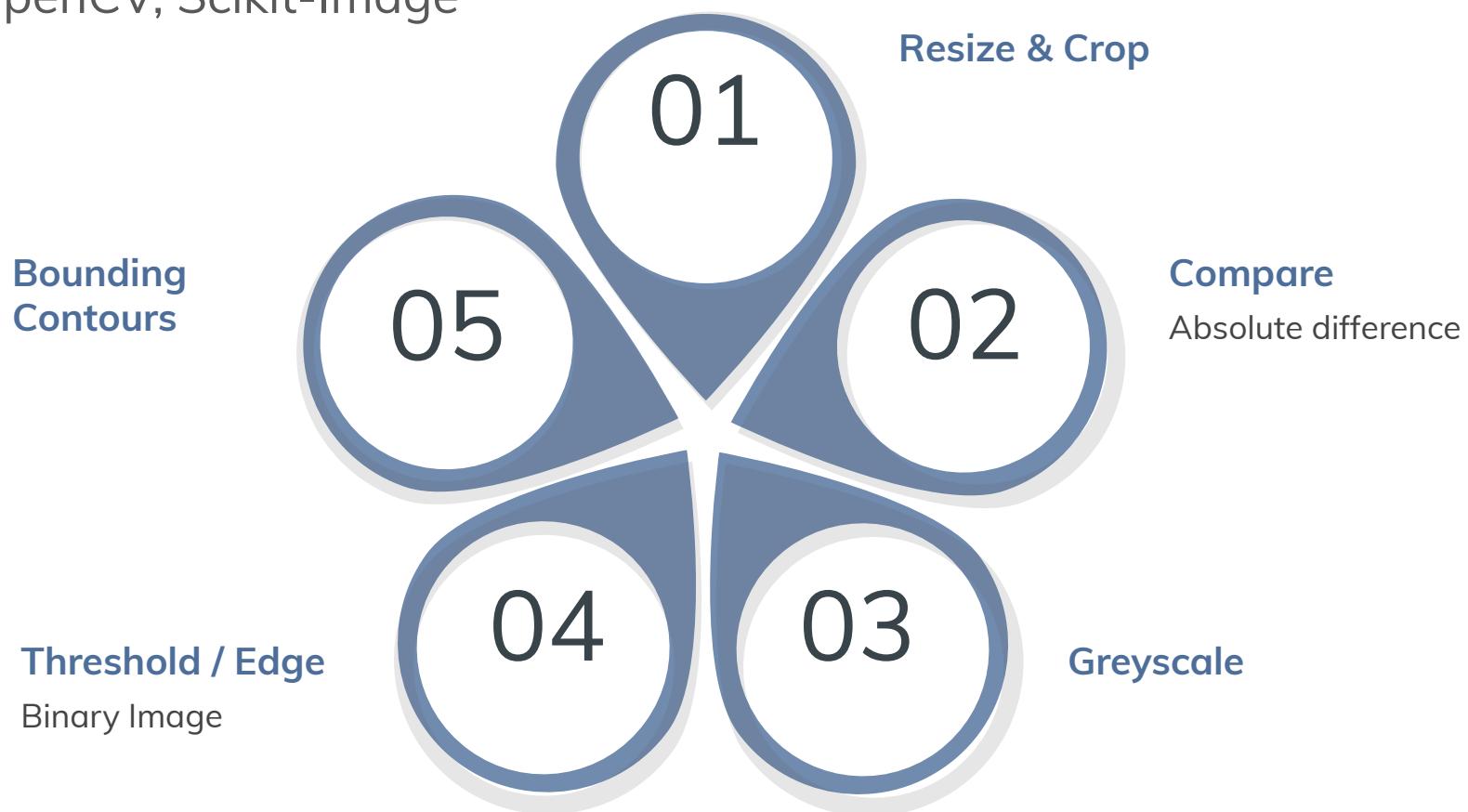
Image Processing

Angela Kunanbaeva



Image Processing Workflow

Using OpenCV, Scikit-Image



Step 1: Resize



Step 2: Compare

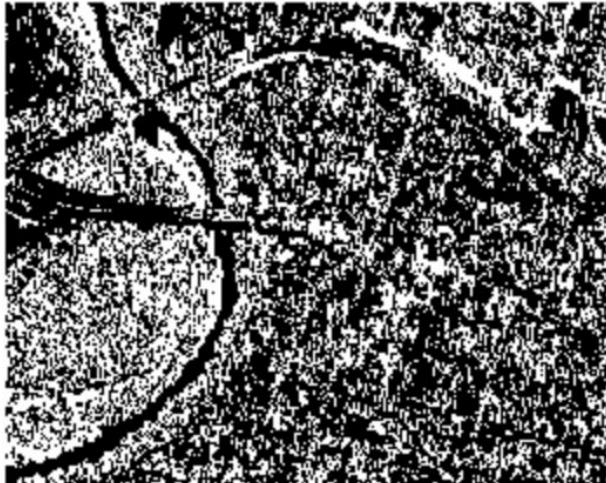
Hurricane Harvey in Texas 2017



Step 3: Threshold

Binarize image

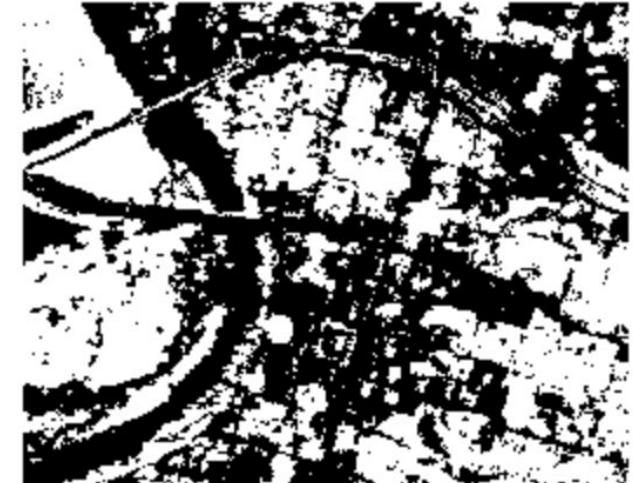
Difference between Images Threshold



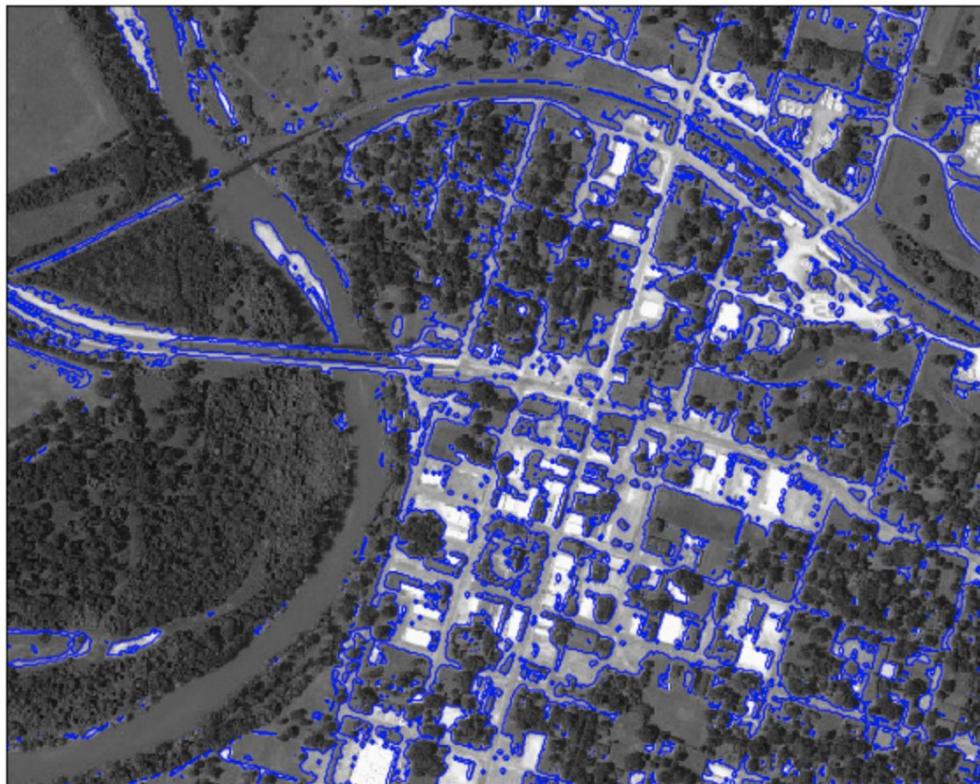
Before Image Threshold



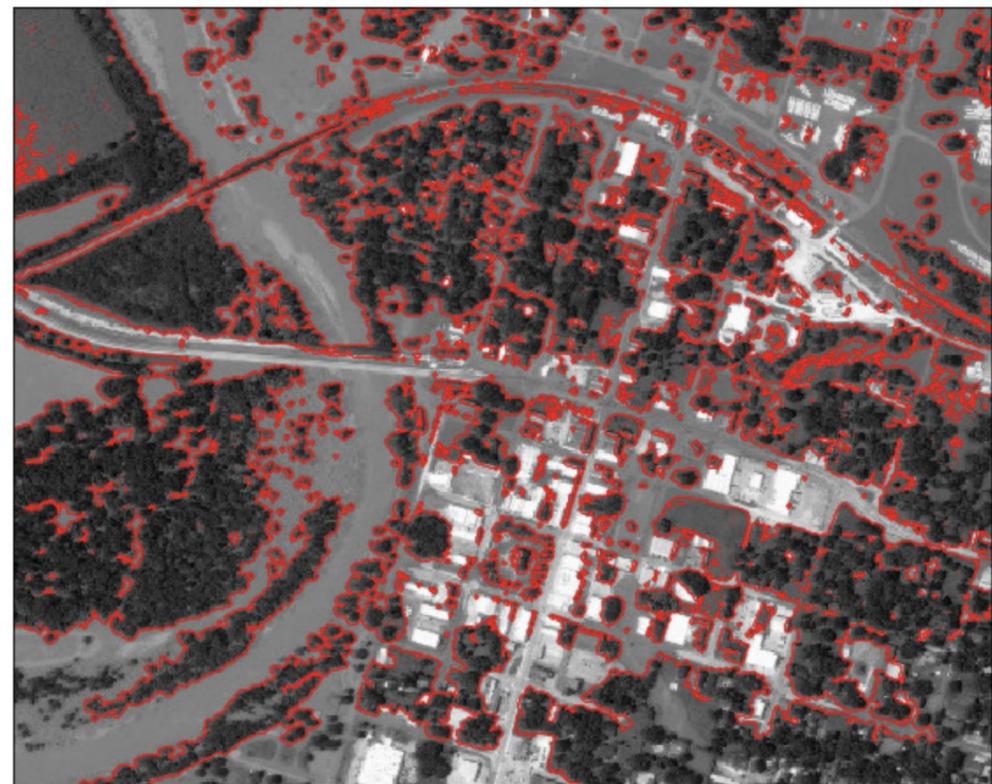
After Image Threshold



Step 4: Creating contours



Before disaster

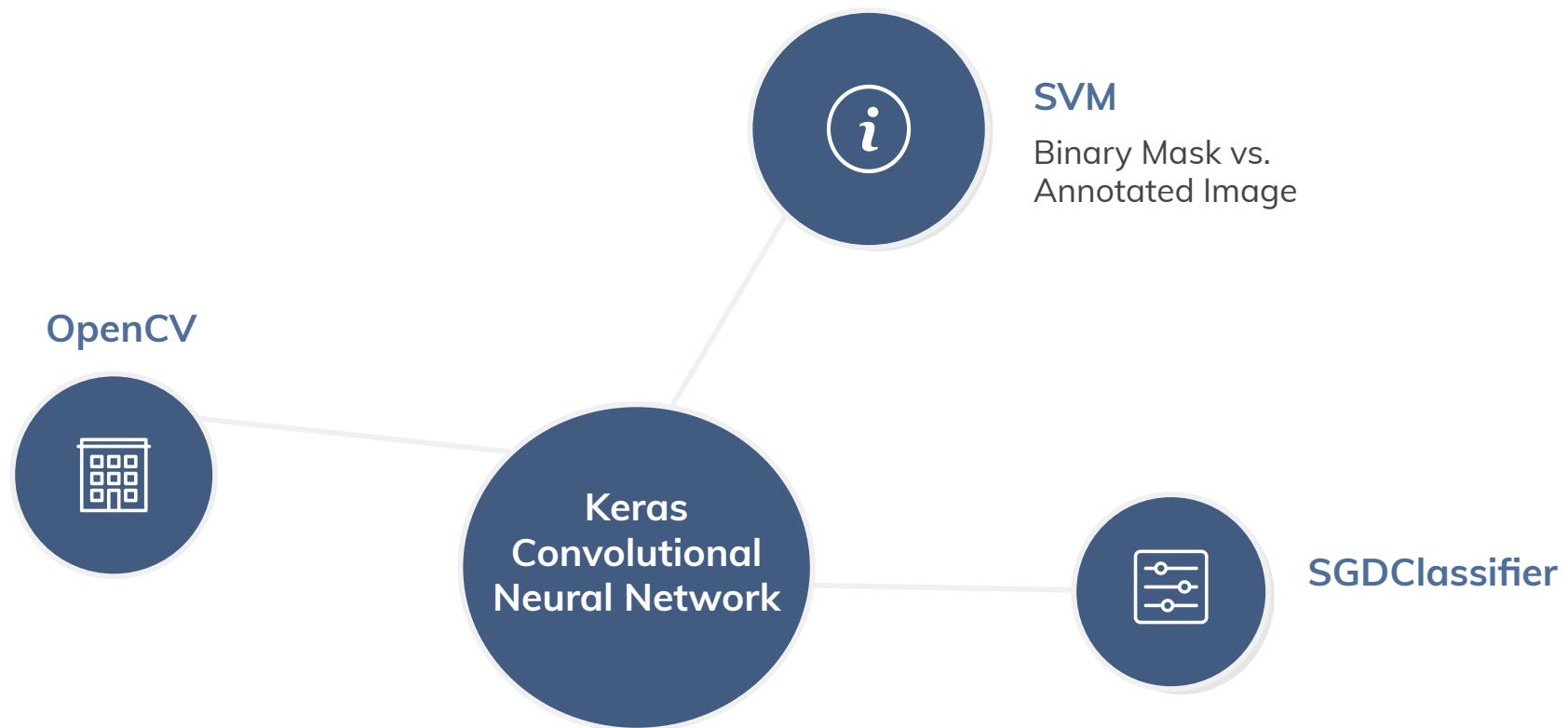


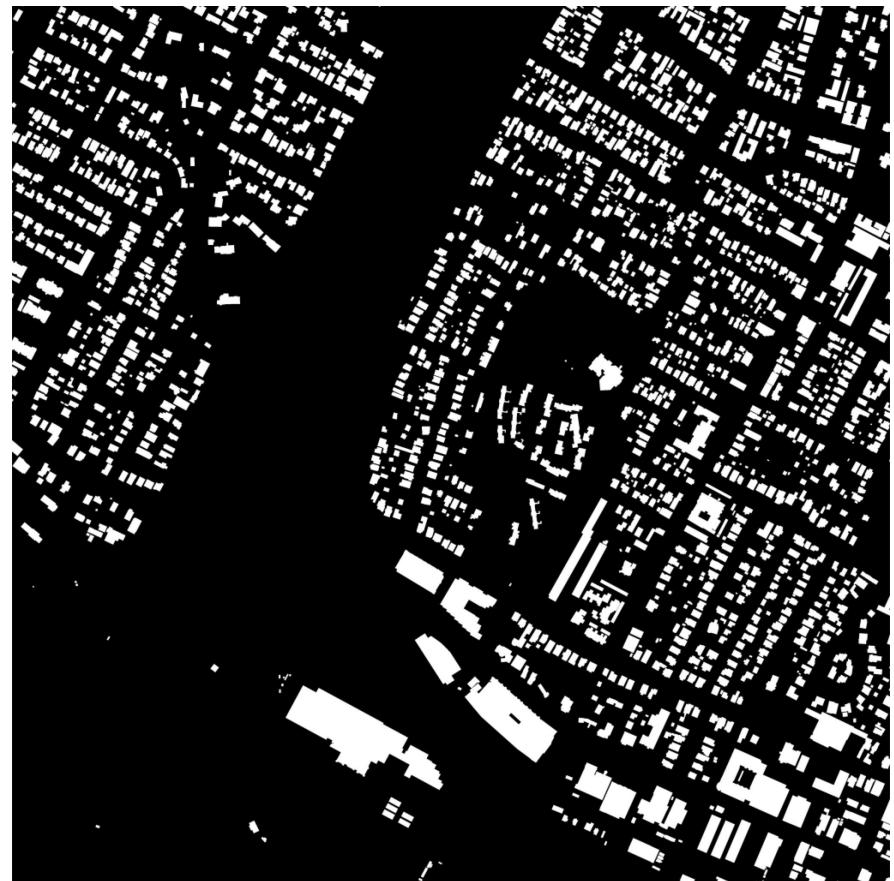
After disaster

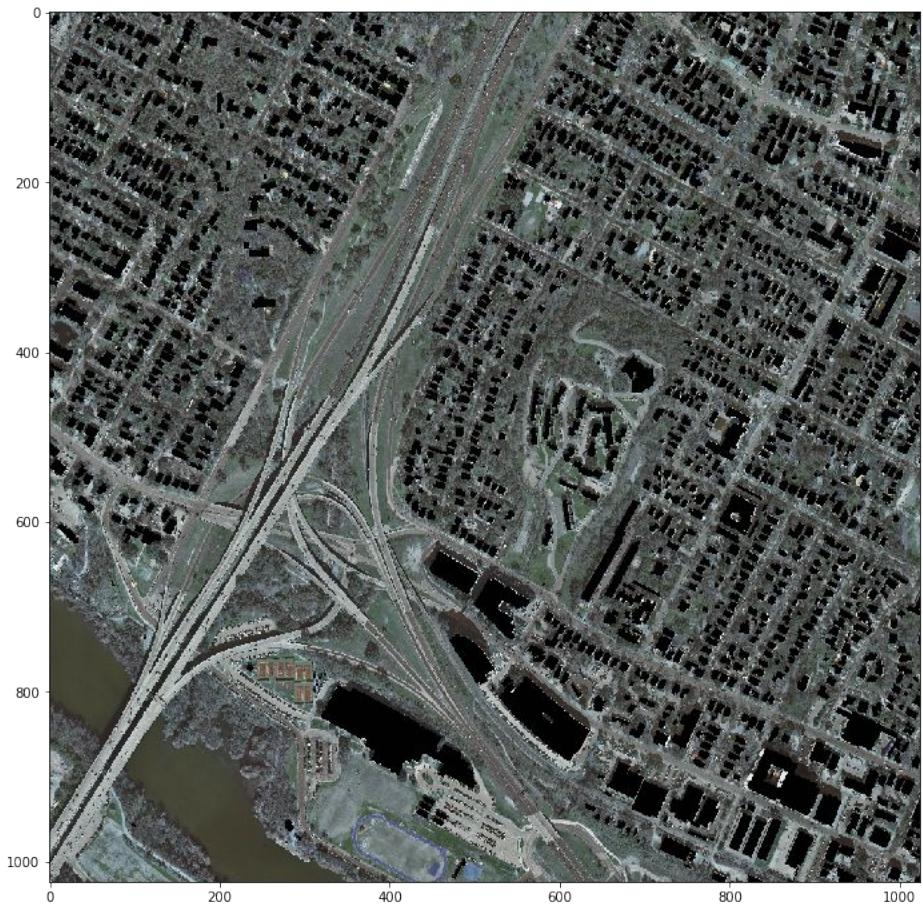
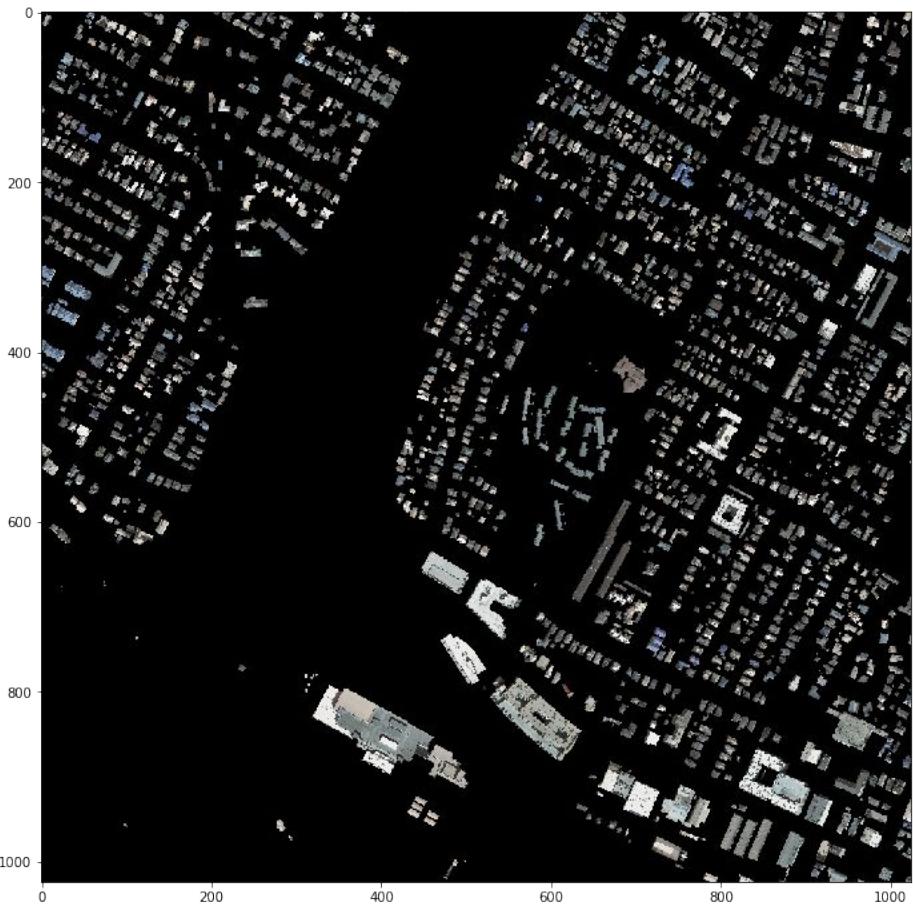
Object Detection

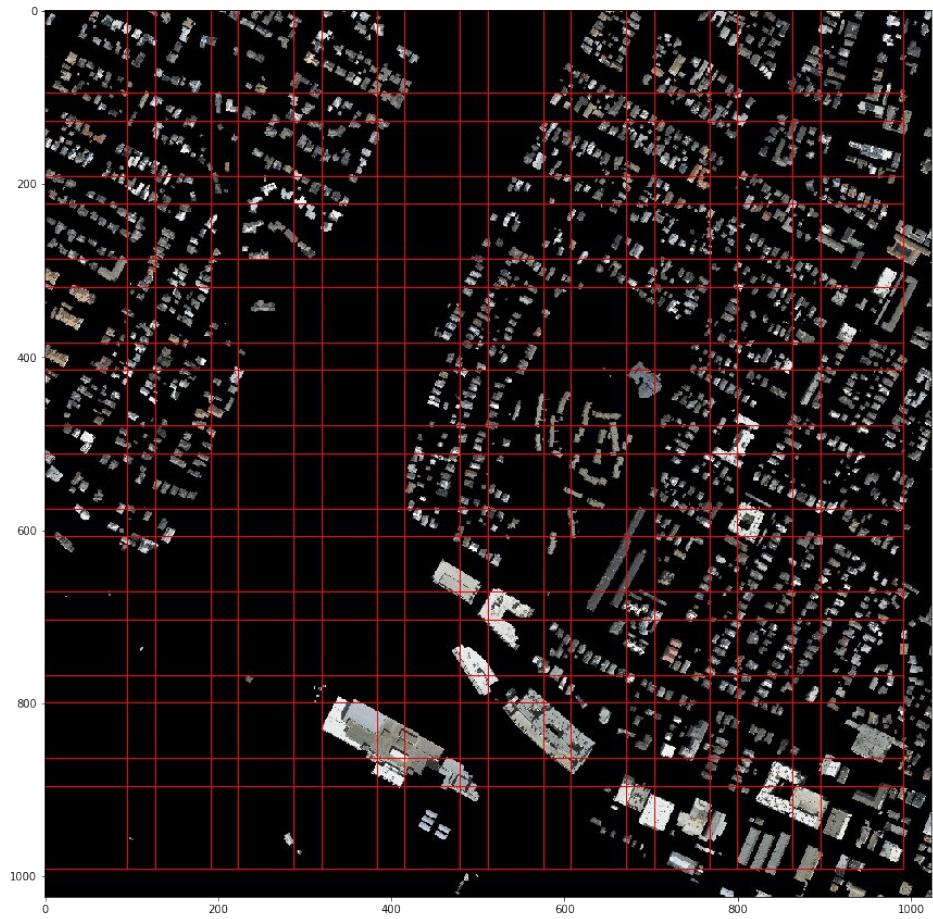
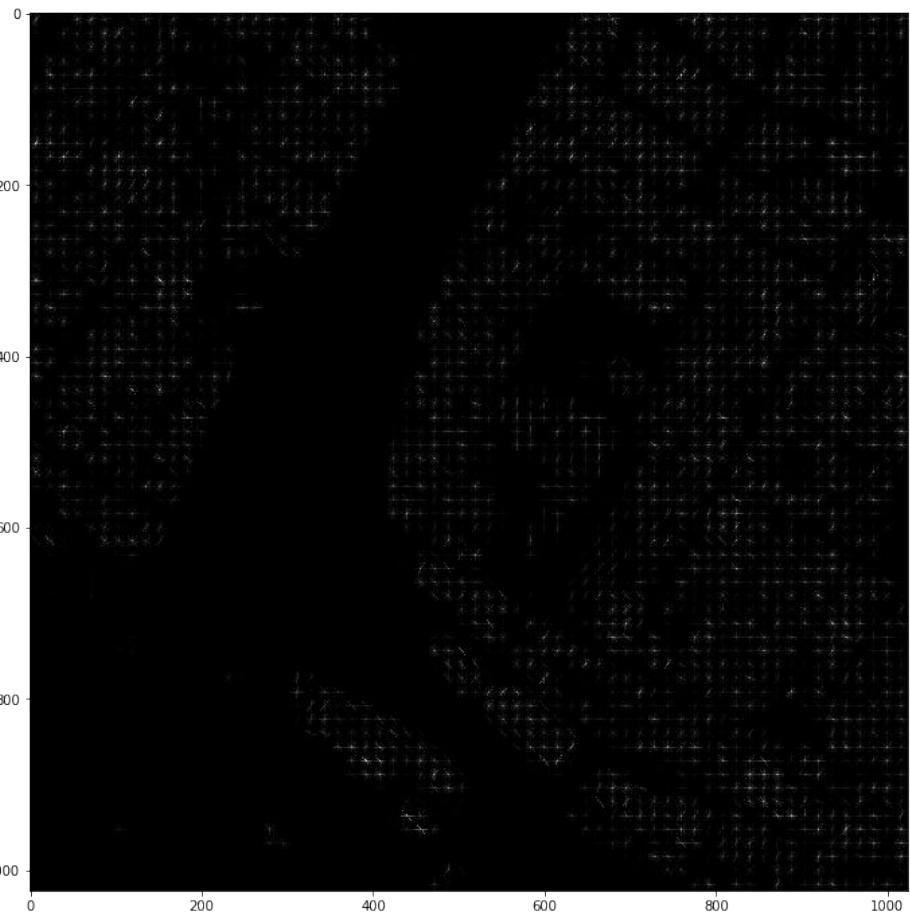
Chris Birch

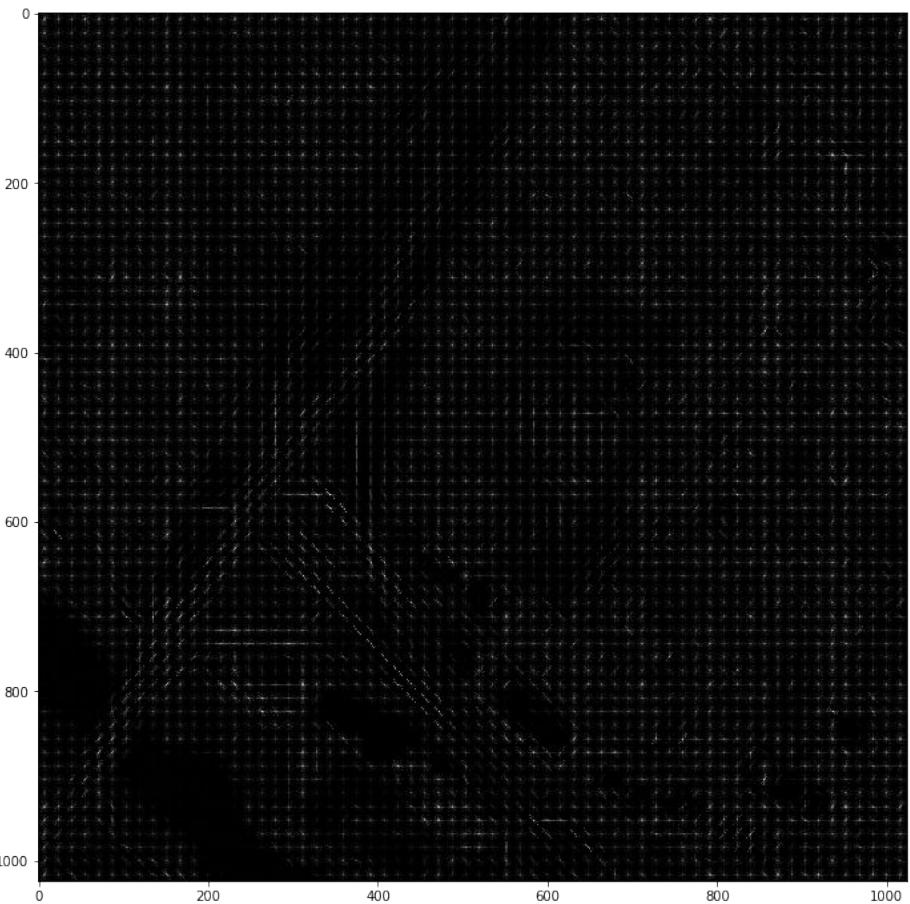
Model Training for Object Detection











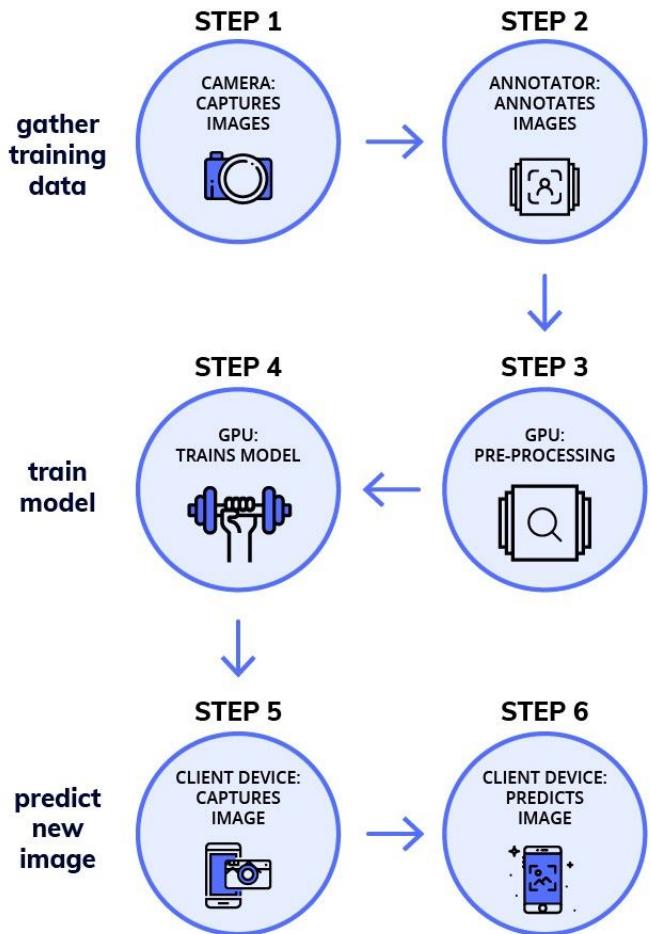


Image source: <https://devblogs.nvidia.com/exploring-spacenet-dataset-using-digits/>

Stroke of:
Genius (Luck)
((Dumb Luck))



Wrap Up

-  Introduction
-  Image Selection
-  Image Transformation
-  Object Detection
-  **Next Steps**

Final Vision



“
... distinguish affected
disaster areas from satellite
images..



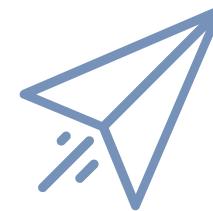
Disaster



Decision Makers



On the Ground



Q & A