What Does the Image Tell You ?

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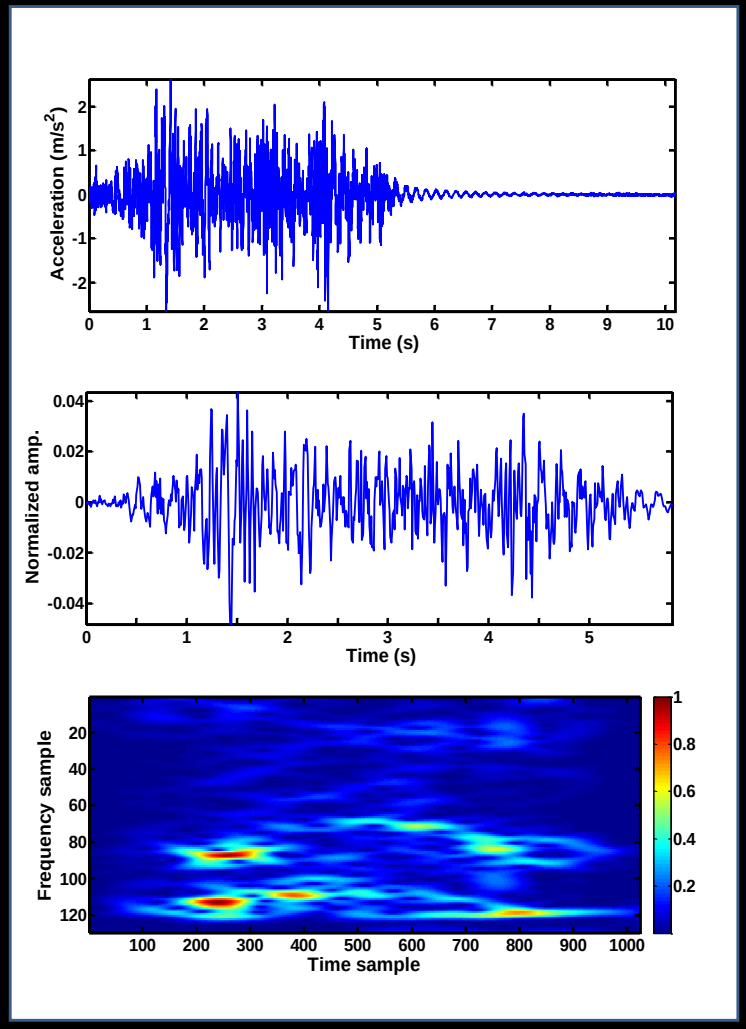
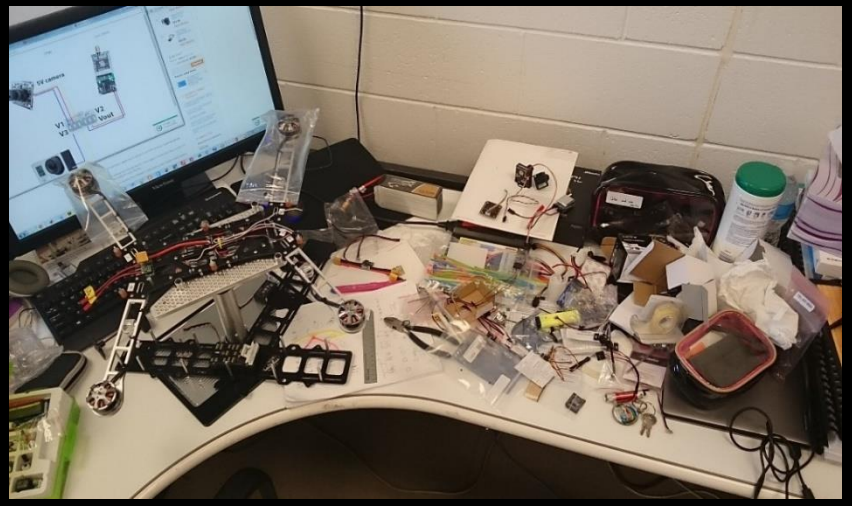
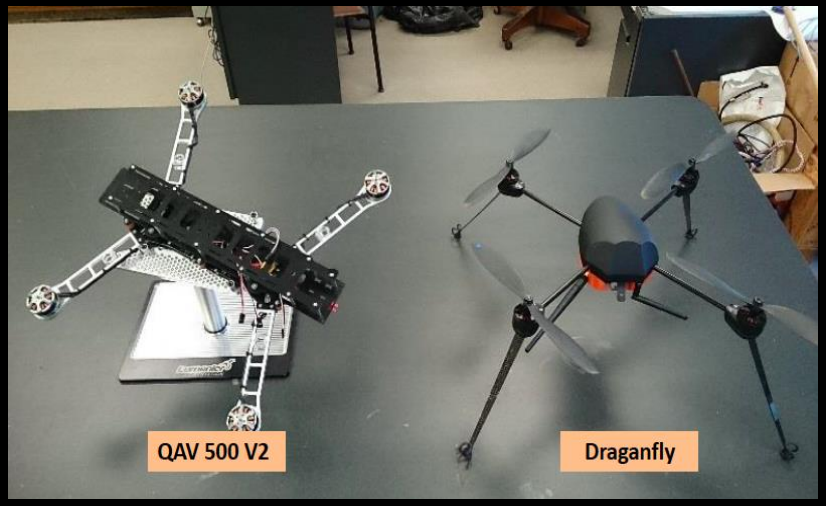
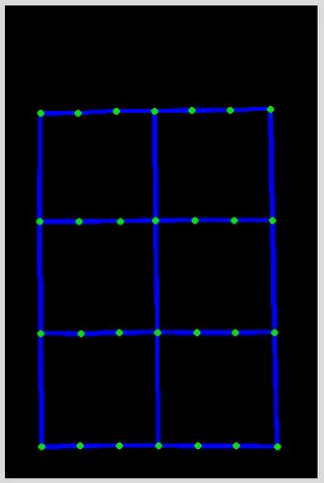


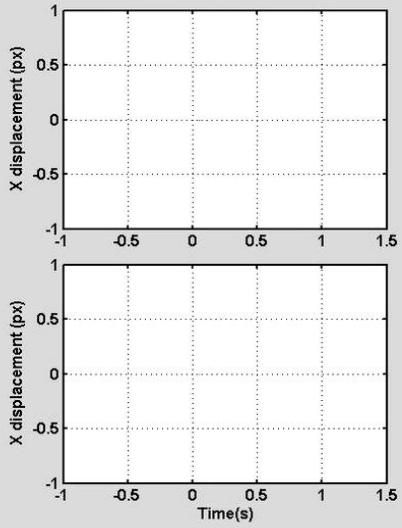
Vehicle detection on a mobile bridge





Build unmanned Aerial Vehicles





Vision based vibration measurement

My research is

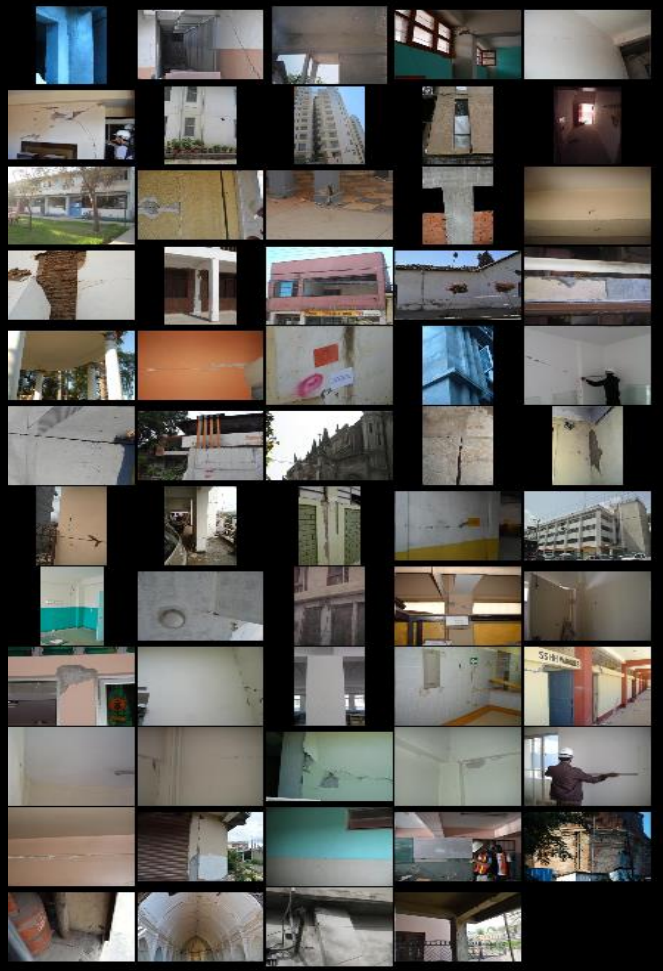
What Does the Image Tell You ?

Nepal Earthquake, 2015


SERVE UN

What if ?

Disaster area



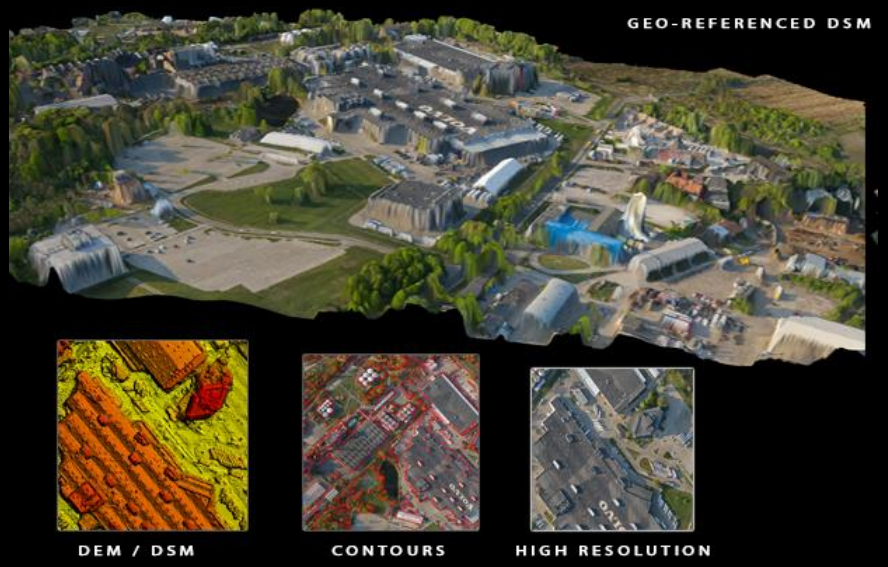
Large-scale images

Autonomous analysis

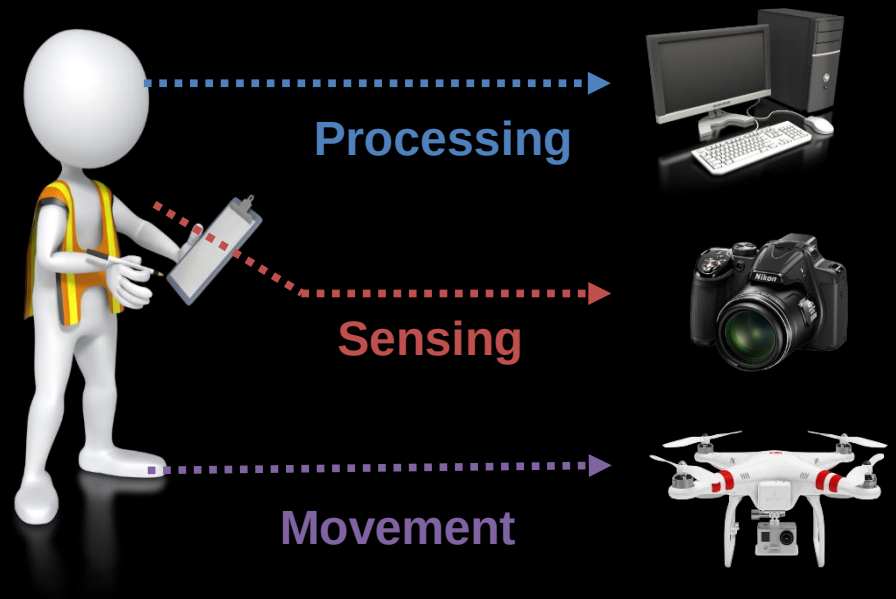
Damage? Undamage?

Support decision-making

Search & Rescue



Mapping or 3D point cloud



Structural inspection

Building damage

Bridge collapse

Road damage

Challenges

Collected Images from a Disaster

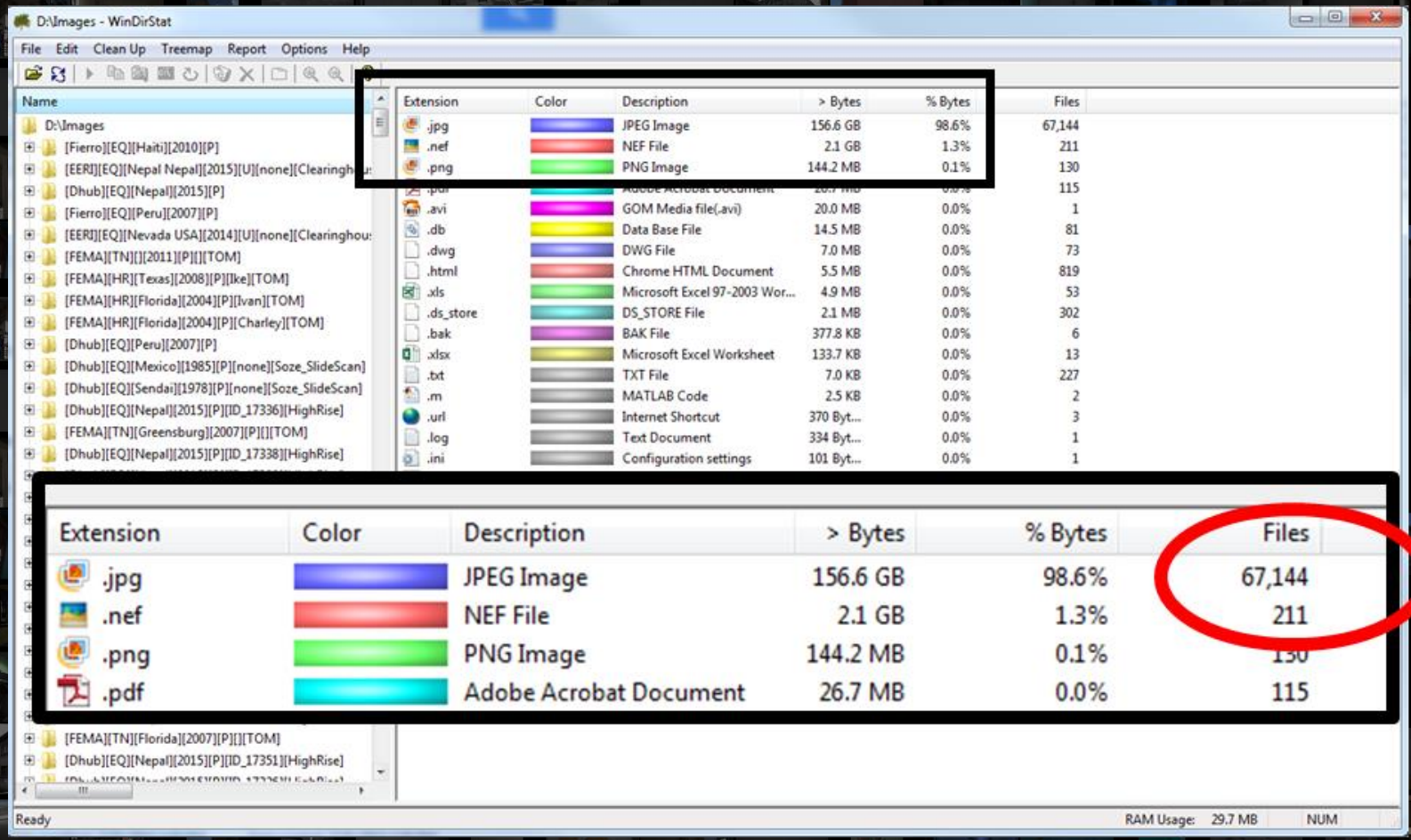
Irrelevant

Relevant

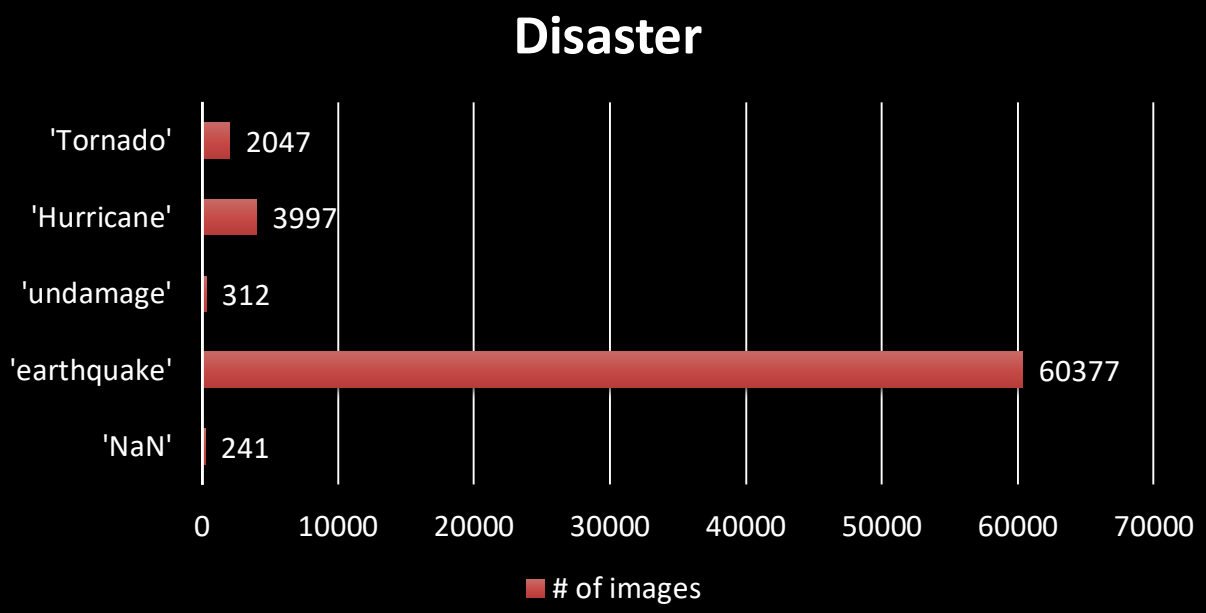
Unorganized and complex images

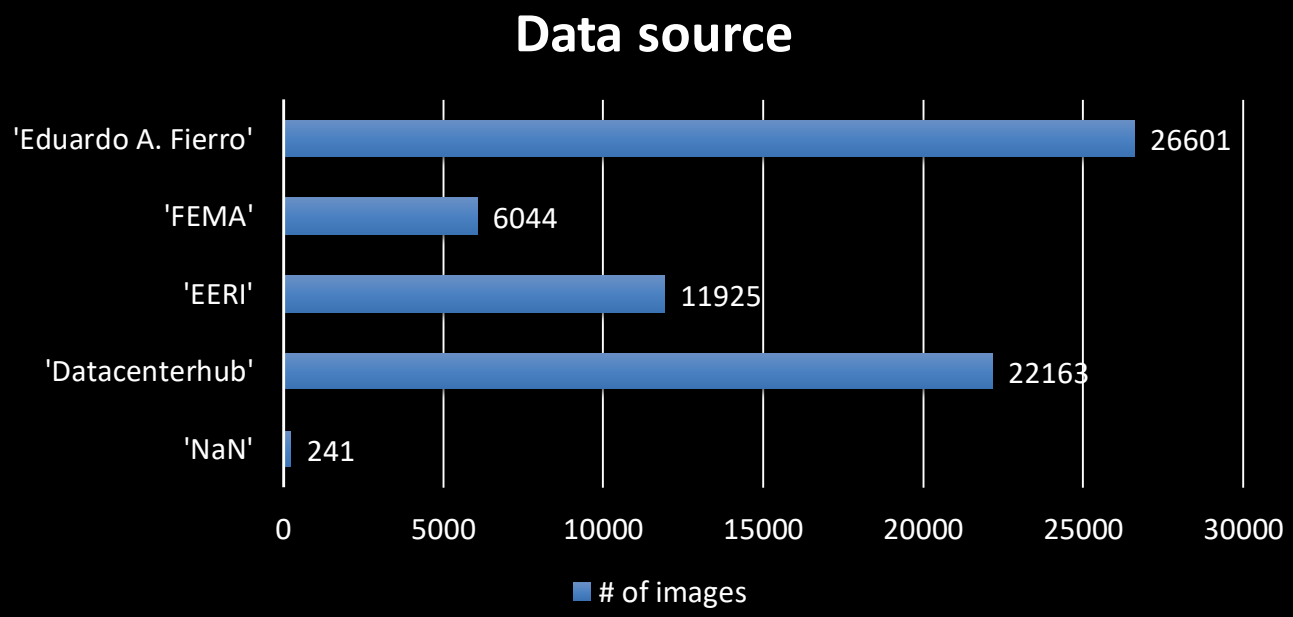
They are dogs.
But I don't
know why !!!

Difficult to describe our object



67,000 Images


Disaster
'Tornado'
2047
'Hurricane'
3997
'undamage'
312
'earthquake'
60377
'NaN'
241
0
10000
20000
30000
40000
50000
60000
70000
# of images


Data source
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'FEMA'
6044
'EERI'
11925
'Datacenterhub'
22163
'NaN'
241
0
5000
10000
15000
20000
25000
30000
# of images

Why Do I Need Many Images ?

- Four legs
- Four corner
- Plat top areas

⋮

Table

Large-scale Image data

Table

Deep Neural Network

Big images data → Training parameters → Ground truth (labels)

60 million parameters
650,000 neurons

Table

Collapse

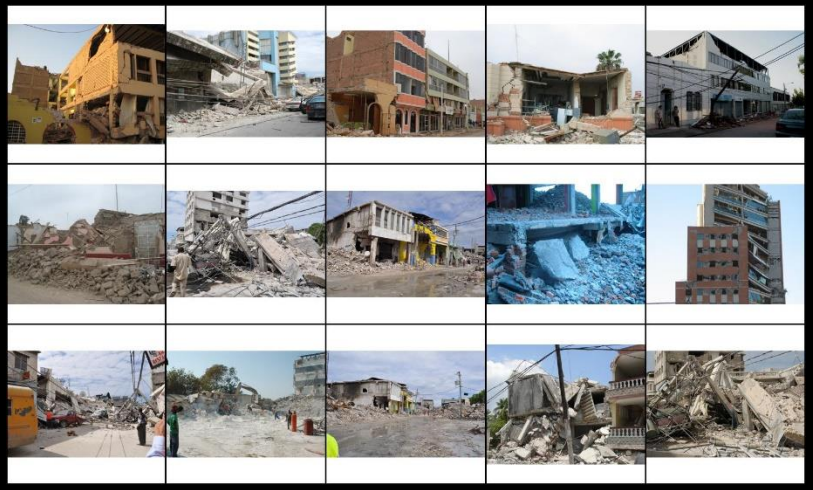
an instance of a structure falling down or in.

Spalling

Break off in fragments

Image annotation among 67,000

Spalling annotation: 1,918 images

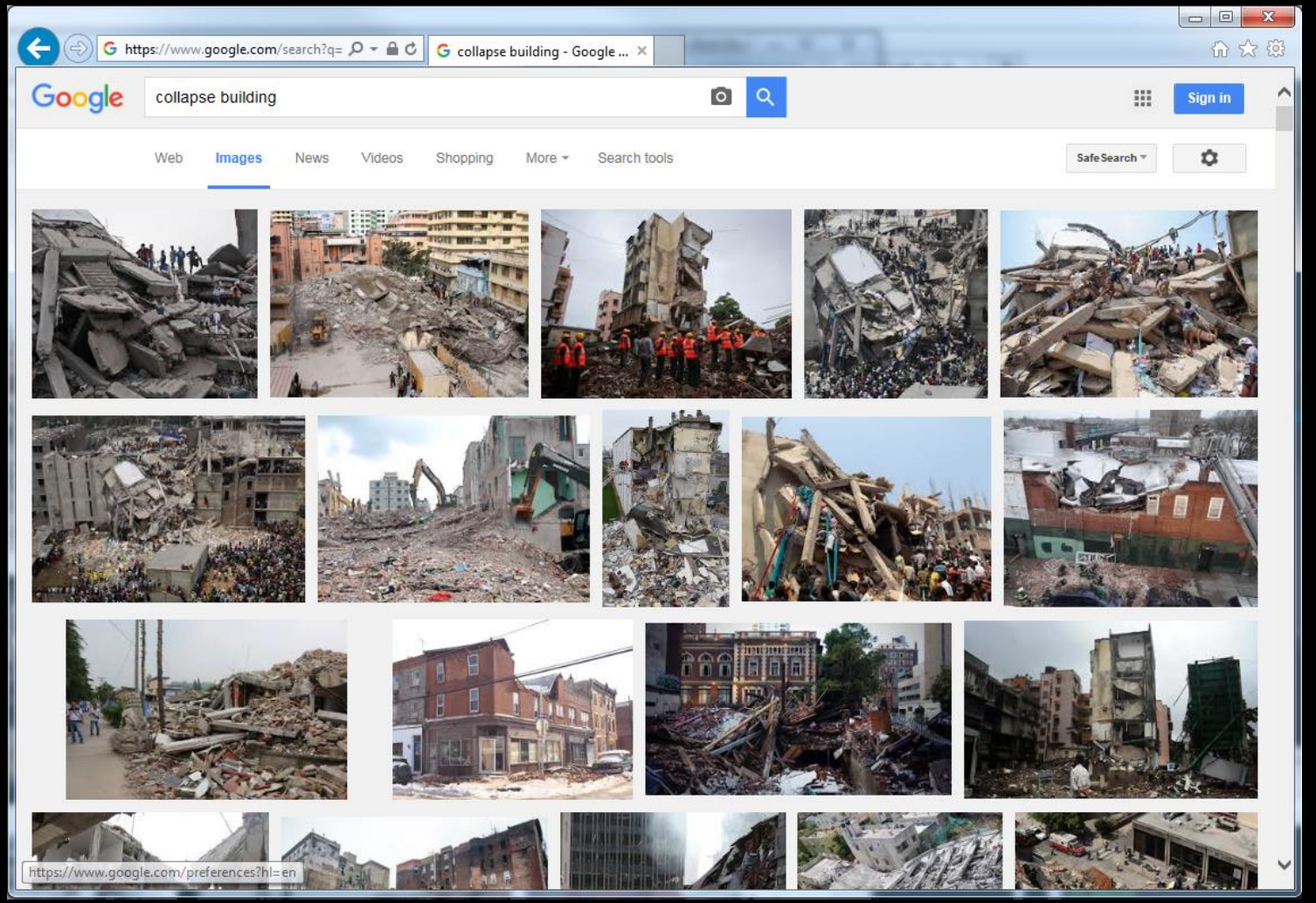


Collapse (Positive): 1,918 images

Non-collapse (Negative) : 3,427 images

Collapse Detection: 91 % Precision


Google
collapse building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Google
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Sign in
Web
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News
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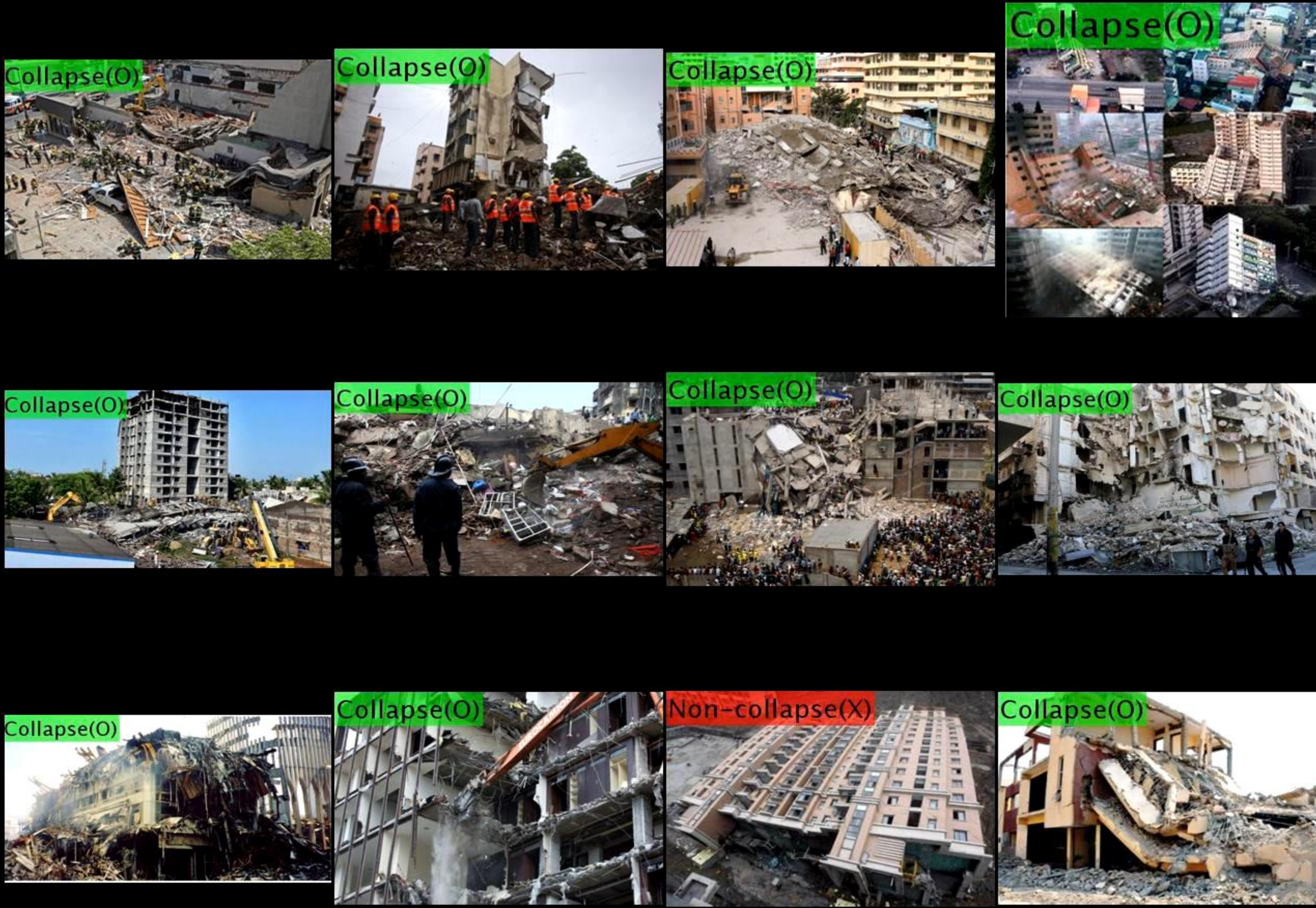
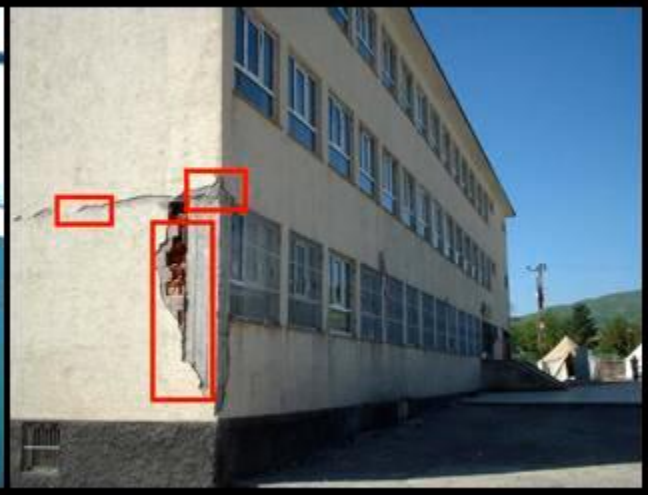


Collapse Detection: 78 % Precision



Spalling Detection on Spalling Images






Spalling Detection on Undamage Images

Future Study

Thank You