

## Motivation and About the Project

Damage assessment is one of the most important steps of disaster response, after the onset of a hurricane. For example, assessing the impact on the number of flooded buildings can help emergency managers, disaster relief organizations and responders in creating a plan of action. We propose a model that classifies satellite images of buildings into unaffected and flooded. Such automation saves the time required to manually visit the damaged sites to assess impact. Our approach was to use SOTAs on images & use an Auto-Encoder based, to see which one is more optimal

## Data and Labels

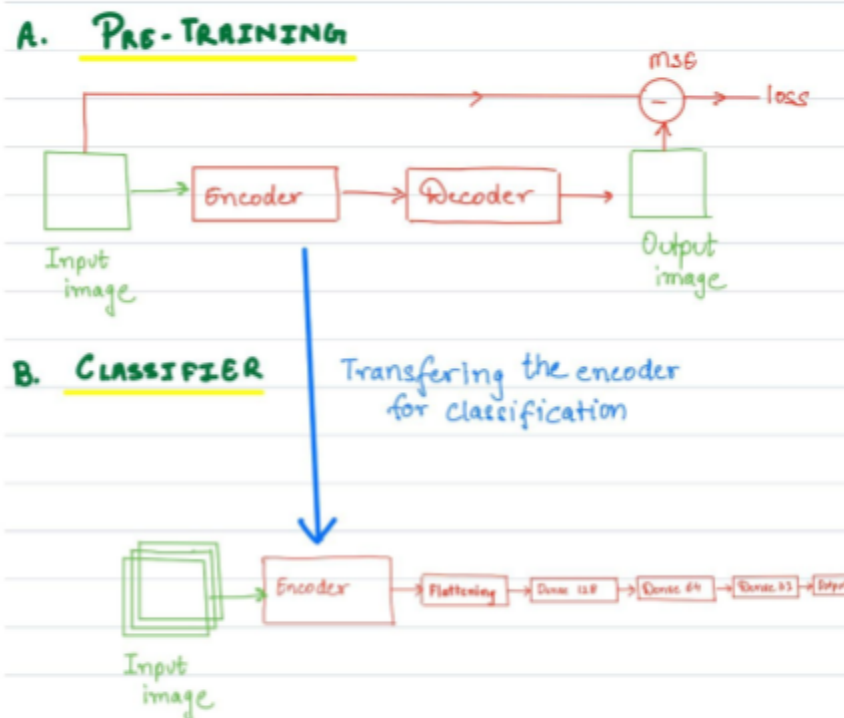
The data set comprises RGB images of resolution 128x128, representing damaged and unaffected buildings. The images are divided into four groups: (1) a training set consisting of 5000 images; (2) a validation set of 1000 images; (3) a balanced test set of 1000 images; (4) an unbalanced test set of 9000 images.

We further got more test data of Hurricane Delta, with help of processing Geospatial Images

## References

- <https://gist.github.com/WittmannF/c55ed82d27248d18799e2be324a79473>
- <https://bit.ly/3qRmvc4>
- Hao, Hanxiang, et al. "An Attention-Based System for Damage Assessment Using Satellite Imagery." arXiv preprint arXiv:2004.06643 (2020).

## Our Custom Model



## Conclusion and Future Work

We propose a robust model for classifying post hurricane damaged buildings from the unaffected ones. By using Learning Rate Finder & Scheduled Learning Rate, we are able to boost the the overall test accuracy to 98-99%. Based on our experiments, we observe that using an Auto-Encoder further enhances our model performance. The solution can be generalised across different hurricanes, and can thereby assist relief helpers and policymakers in decision-making.

Our results can be improved by training the model with larger and more diverse hurricane datasets across different geographies. In addition, we can make changes to the decoder architecture and pre-process the image in different color spaces .

## Results

Architecture	No. of params	LR Scheduler	Epochs	Train time (min)	Val acc	Test acc biased	Test acc unbiased
VGG	14747650	[0.001, 0.0001]	[16, 14]	55	92.3	90.5	91.6
ResNet-50	23718978	[0.001, 0.0001]	[12, 10]	38.5	96.1	95.2	96.5
InceptionV3	21934050	[0.001, 0.001]	[19, 17]	96	98.1	98.4	98.6
Custom Model	4210866	[0.003, 0.001]	[32, 14]	34.5	96.1	97.3	96.4