

MOTIVATION AND OBJECTIVES OF THE PROJECT

- To assess the damages caused by hurricanes using satellite imagery.
- To classify buildings between damaged and not damaged buildings.

DATA AND LABELS

- The image dataset is taken from "Geo-satellite sensor" and "Geo Bigdata".

| Dataset Names | Class | |
|--------------------------|-------------|-------------|
| | Damaged | Not Damaged |
| train_another | 5000 images | 5000 images |
| validation_another | 1000 images | 1000 images |
| test_another(unbalanced) | 8000 images | 1000 images |
| test(balanced) | 1000 images | 1000 images |

REFERENCES

- GeoEye-1 Satellite Sensor | Satellite Imaging Corp (satimagingcorp.com)
- GBDX · GitHub

MODEL

- The base model is the unregularized CNN.
- Regularization of the base model was carried out using Batch normalization and Dropout layers.
- Modified models were built using pre-trained weights of the ImageNet dataset.
- Saliency maps, Image occlusion and GradCAM heatmaps were used for visualization.

RESULTS

| Model | Accuracy | |
|--------------|------------|----------|
| | Unbalanced | Balanced |
| Base | 0.97 | 0.94 |
| Inception V3 | 0.99 | 0.99 |
| Regularized | 0.89 | 0.5 |
| Resnet-50 | 0.84 | 0.92 |
| VGG19 | 0.99 | 0.99 |
| Mobilenet | 0.99 | 0.99 |

CONCLUSION AND FUTURE SCOPE

- We can infer that VGG-19, Mobilenet and Inception-V3 models give the best accuracy scores.
- Pretrained weights of ImageNet helped us achieve better classification accuracy test datasets.
- The saliency maps and GradCAM heatmaps captured the features of the images quite accurately in most of the models.
- We can further take more problem-specific data to train the model better and get even better accuracy scores..
- As a matter of future research, we can work on building up more efficient model architecture for predictions comparable to SOTA models.