# COSMOLLIGENCE HACKATHON REPORT

## TEAM: Wall E

Team Members:

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## Problem Statement:

Natural disasters have caused a huge havoc on public property. Build a solution that can detect from images, the damaged building, and its severity.

## Dataset:

* <https://universe.roboflow.com/ai-imagery/isbda_classification>
* <https://universe.roboflow.com/kios-alpsc/rescuenet-yolo8/browse?queryText=&pageSize=50&startingIndex=0&browseQuery=true>
* <https://eod-grss-ieee.com/dataset-detail/OWlUN0k3T0tnNVo2Rk5mNjFxTkhwZz09>

## Approach:

* Analyzed the dataset to find important columns and interpreted the annotations to drop irrelevant information.
* Performing Object Detection for identifying multiple classes according to severity of damage by natural disaster on property.
* These classes divide the effect of the disaster as follows:

1. No Damage
2. Moderate or Minor Damage
3. Major Damage
4. Destroyed or ‘Total Destruction’

## Model:

* Realizing the size of all the datasets and their characteristics, the labels were formatted according to the model. (vector of class category, box details)
* Considering the size and number of datasets, YOLOv7 was used.
* Two models were trained on different datasets with same architecture synonymous to YOLOv7 but with different hyperparamters fitting the respective datasets.
* The models also differ in the classes of severity which they tackle. This is because of the difference in the distribution encountered in the datasets.

## Metric:

### Mean Average Precision (mAP)

1. Model 1: YOLOv7\_(trained on a smaller dataset)

* [mAP@0.5](mailto:mAP@0.5) - 0.516
* [mAP@0.5:0.95](mailto:mAP@0.5:0.95) – 0.325

1. Model 2: YOLOv7\_(trained on a larger dataset)

* [mAP@0.5](mailto:mAP@0.5) – 0.812
* [mAP@0.5:0.95](mailto:mAP@0.5:0.95) – 0.550