NC STATE UNIVERSITY

Understanding Cloud From Satellite Images

Computer Science

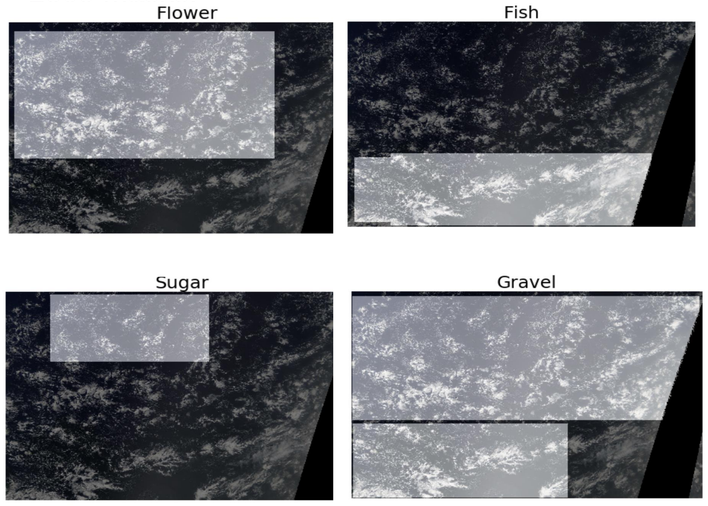
Team 125

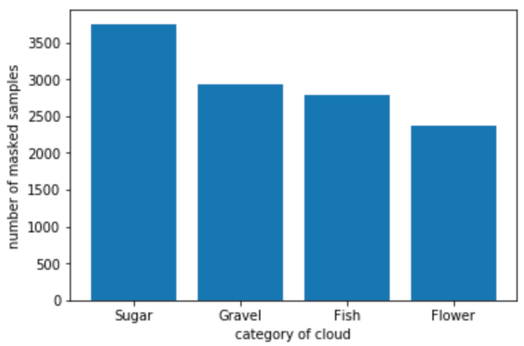
MOTIVATION

- Improve physical understanding of the clouds—their shapes.
- Cloud formation helps understand the climate system and weather patterns.

DATA

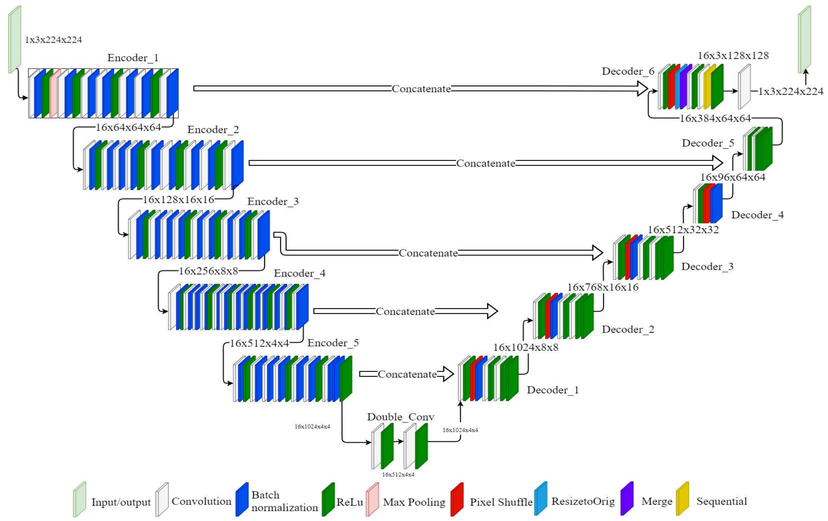
- Cloud Organization Dataset from [1]—MODIS and GOES-16 satellites.
- 4 classes—Flower, Sugar, Fish, and Gravel.
- **5546 images** in Total, each image up to 4 masks. **266** images have all 4 masks.
- Sugar: 3751, Gravel: 2939, Fish: 2781, Flower: 2365 masks.



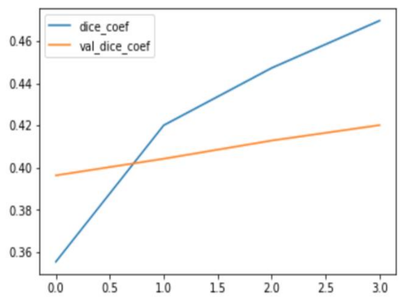


MODELS AND RESULTS

- **Baseline**: UNet with ResNet34 Encoder



10 epochs—45% accuracy



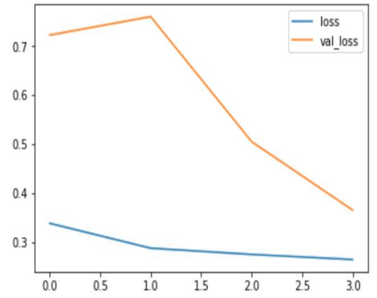


Fig. Baseline model performance

- EfficientNet

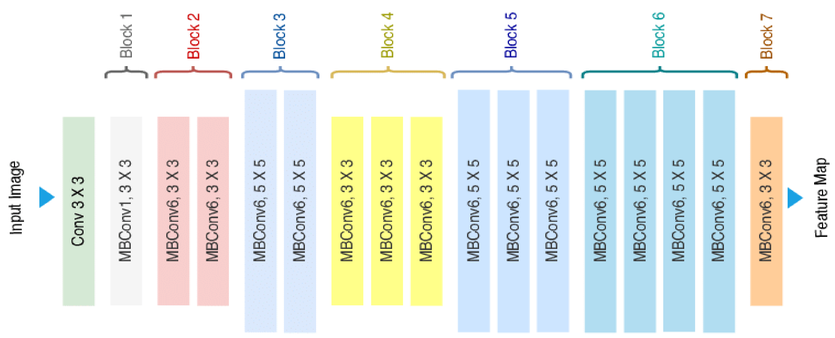
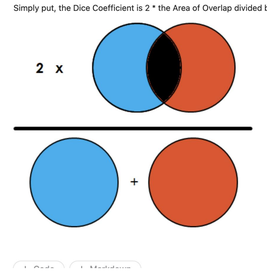


Fig. Final Model performance

10 epochs—65% accuracy

- Dice-coefficient as the accuracy measure—2*the Area of overlap between the total pixels of the images.
- Image augmentation using **albumentations**.
- **Fine tuning hyperparameters** using the dice loss values after each epoch.
- Using **PR AUC**(precision recall area under curve) callback to determine how many epochs to train.



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- Tan, M., & Le, Q. V. (2019). EfficientNet: Rethinking Model Scaling for Convolutional Neural Networks. arXiv. https://doi.org/10.48550/ARXIV.1905.11946