Individual Final Project Report

Flooding Damages Detection from Post-Hurricane Satellite Imagery Based on Convolutional Neural Networks

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Bixuan and I completed this project together. We divided the workload of the project into two major parts. Bixuan was responsible for designing and building a custom convolutional model, while I was in charge of implementing the two pre-trained models (VGG-16 and Resnet50). During the hyperparameter fine tuning process, we first explored methods to improve our own models independently. We then exchanged our findings from our independent experiments. After constant exchange of ideas, we absorbed the advantages from the other member's work and incorporated those findings to improve our respective models.

In the final group project report, I drafted an abstract for this project, provided a brief introduction of research problem and description of the dataset in section **1. Introduction**. Additionally, I described the portion of my work in details in section **2. Pre-trained Models**. I provided the results of my experiments and evaluated the performance of all three models in section **4. Results**. I also provided a conclusion of our project in section **5. Conclusion**. Except for section 3 **Custom Model**, I wrote almost the entire report. Therefore, I tend to not repeat the same content here in this individual report.

I presented my individual code in the file titled "*Pretrained_Model.py.*" The code shows how I load the data, apply image augmentation on satellite images, implement the pre-trained models (VGG-16 and Resnet50), made predictions on the hold out test set, and generate line plots and confusion matrix to evaluate the performance of the models. I borrowed codes from Will Koehrsen[1] when drafting the part where I need to replace the classifiers of the pre-trained models with my own custom classifier. Other than this part, the rest of the code is mostly my individual work. The percentage of the code that I found or modified from the internet is roughly 32%.

[1] https://github.com/WillKoehrsen/pytorch_challenge/blob/master/Transfer%20Learning%20in%20PyTorch.ipynb