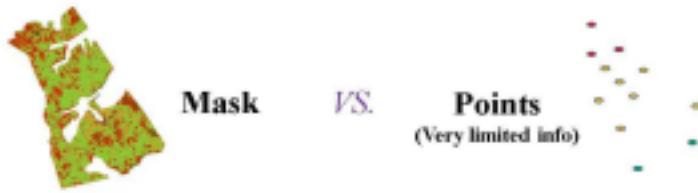


Problem Statement:

Our problem itself is a segmentation problem, that is, classifying each pixel

But in general, deep learning requires complete segmentation **mask** during training



And our annotation is based on **points**, or incomplete tagging, which is not a common deep learning situation, and it's a very challenging problem

To overcome this challenge of limited point annotation information, we developed a custom deep learning framework for the landvisor project, which consists of:

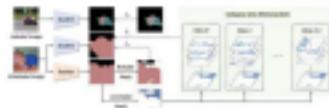
- The baseline is guaranteed by using transfer learning and pre-training models based on large amounts of data



- A special loss function (called partial CE loss) is designed so that point labeling can be used to train the segmentation model

$$\text{pfCE} = \frac{\sum [\text{FocalLoss}(\text{pred}, \text{GT}) \times \text{MASK}_{\text{selected}}]}{\sum \text{MASK}_{\text{selected}}}$$

- Semi-supervised technology is used to make full use of unmarked pixels to further improve model performance



- Use amplification when testing to improve performance
- Use ensemble learning to integrate multiple deep learning models to further improve performance
- Referring to the original ML pipeline, histogram matching is used to ensure the stability of the picture style

Task:

- Implement partial Cross entropy loss
- Find any remote sensing image segmentation data, randomly sample the simulated point label, and add the loss to any remote sensing segmentation network
- Design experiments, explore one or two factors that affect the performance, and write technical reports (method + experiment(purpose/hypothesis + experimental process + results))

Tools:

You may use any deep learning toolbox to solve the task but must use Python as the programming language. You can

send me task in the form of a python file or a Jupyter notebook along with the supporting document.