Initial Project Proposal

- Paper: *SimMIM: A Simple Framework for Masked Image Modeling*
  - Accepted to CVPR 2022. Authored by Microsoft. GitHub
- Description: A simplified framework for masked image modeling.
  - **Masked image modeling**: Predicting masked out regions of an image.
  - Prior frameworks for MIM required complex designs.
  - SimMIM yields competitive/SOTA benchmarks while being simpler.
- New dataset: CheXpert
  - 224,316 chest radiographs of 65,240 patients.
  - 14 observations per image, each positive, negative, or uncertain.
- Core technical challenge:
  - *SimMIM*, as with prior MIM frameworks, is trained on ImageNet-1K.
  - However, radiographs are significantly less diverse than ImageNet images.
  - Furthermore, features of a positive observation may be strongly localized in specific image regions, but labels are ignored in pre-training. So, the model may primarily learn global anatomical structure rather than pathology-relevant representations.
  - The core challenge is therefore determining whether SimMIM can perform self-supervised representation learning of radiographs and whether these representations can be efficiently fine-tuned to accurately classify clinical observations.