

A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front one is blue and the back one is a light green. They are positioned diagonally, with the blue one partially covering the green one.

# Tomographic Medical Image Reconstruction Using Deep Learning - Milestone 1

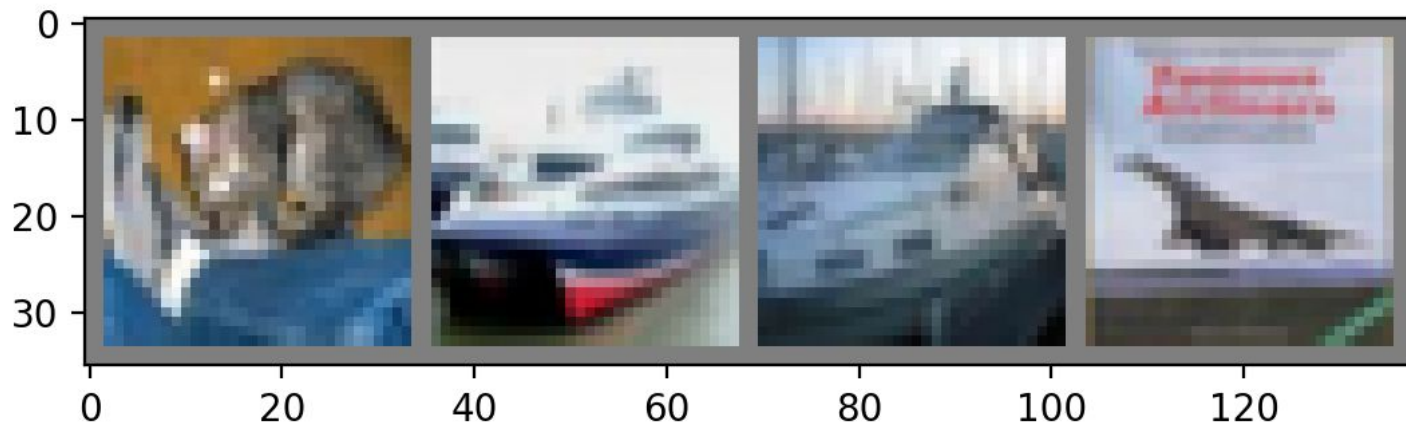
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# What we did

Task	Completion	Asher	Chris	Ty	Todo
Learn about medical imaging	100%	50%	0%	50%	None
Learn about project tech	70%	30%	10%	30%	Learn Open-GATE simulation
Create machine learning demo	80%	0%	80%	0%	We have a demo, but still need to learn some PyTorch syntax
Set aside validation data	100%	0%	100%	0%	None
Make requirement document	100%	0%	0%	100%	None
Make design document	100%	100%	0%	0%	None
Make test document	100%	0%	100%	0%	None

# CNN Demo



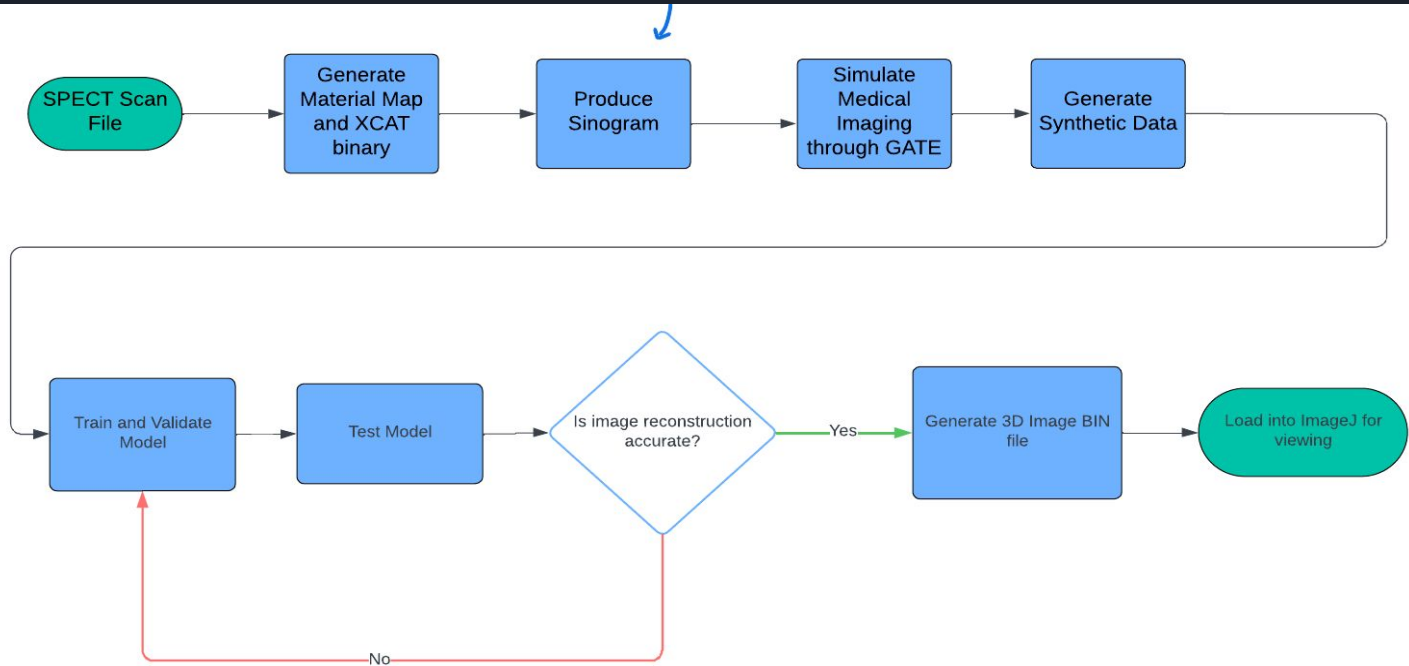
```
$ [2, 6000] loss: 1.349
$ [2, 8000] loss: 1.337
$ [2, 10000] loss: 1.282
$ [2, 12000] loss: 1.296
Finished Training
GroundTruth:  cat   ship  ship  plane
Predicted:   cat   ship  car   ship
□
```



# CNN Demo

```
Accuracy of the network on the 10000 test images: 53 %  
Accuracy for class: plane is 50.1 %  
Accuracy for class: car is 72.7 %  
Accuracy for class: bird is 55.9 %  
Accuracy for class: cat is 23.5 %  
Accuracy for class: deer is 25.3 %  
Accuracy for class: dog is 46.2 %  
Accuracy for class: frog is 69.6 %  
Accuracy for class: horse is 60.7 %  
Accuracy for class: ship is 72.7 %  
Accuracy for class: truck is 58.6 %
```

# System Pipeline





# Neural Network Architecture Design

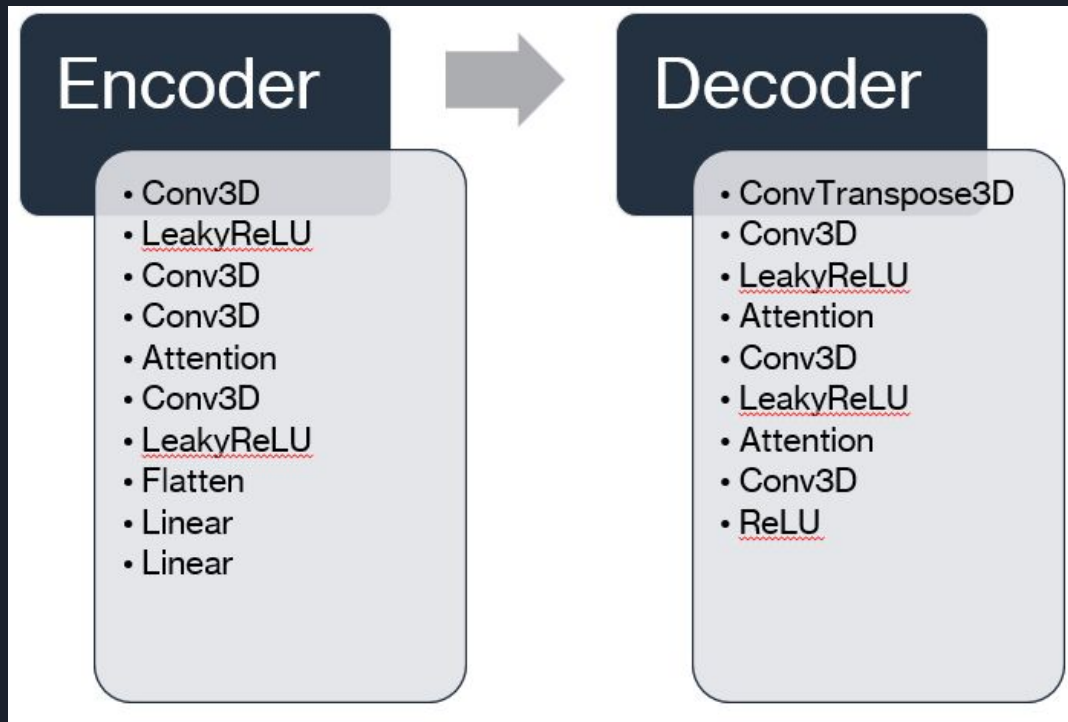
Our model consists of a Convolutional Encoder-Decoder structure.

It includes:

- CNNs to process the input image data.
- Attention layers to extract the most important features from the images.
- An encoder-decoder structure to transform the original SPECT image into another form (a 3D model).

# Neural Network Architecture Design

Note: This is the baseline model that is in the lab, but since it is not giving the desired results, it will be completely revised. However, the encoder-decoder structure with CNNs and attention layers will remain the same.





## Task Matrix - Milestone 2

Task	Asher	Chris	Ty
Learn how to use Open-GATE simulation	33%	33%	33%
Learn Pytorch syntax (secondary)	33%	33%	33%
Generate synthetic SPECT data	33%	33%	33%





Questions?