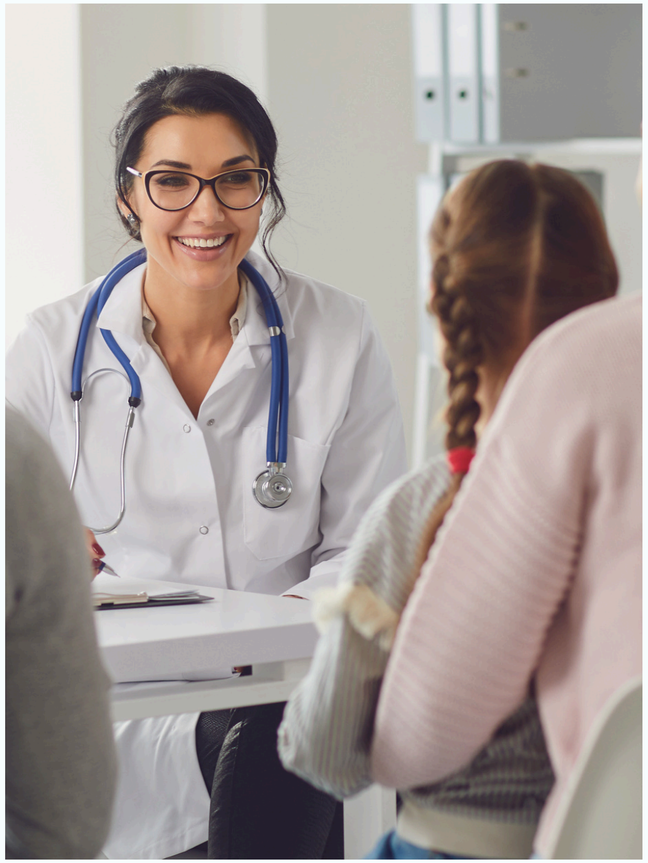
DISEASE DIAGNOSIS FROM MEDICAL IMAGING

PROBLEM STATEMENT AND APPROACH

- **Problem Statement:** Develop a deep learning model to diagnose diseases from chest X-ray images.
- **Approach:** Utilize Convolutional Neural Networks (CNNs) to classify images into categories such as COVID-19, Pneumonia, and Normal.



DATASET DETAILS

- **Dataset:** COVID-19 Radiography Database
- **Classes:**
  - COVID-19: X-ray images of patients diagnosed with COVID-19
  - Pneumonia: X-ray images of patients with Pneumonia
  - Normal: X-ray images of healthy individuals
- **Image Type:** Chest X-rays

https://www.kaggle.com/datasets/tawsifurrahman/covid19-radiography-database

SAMPLE IMAGES FROM EACH CLASS

Covid

Normal

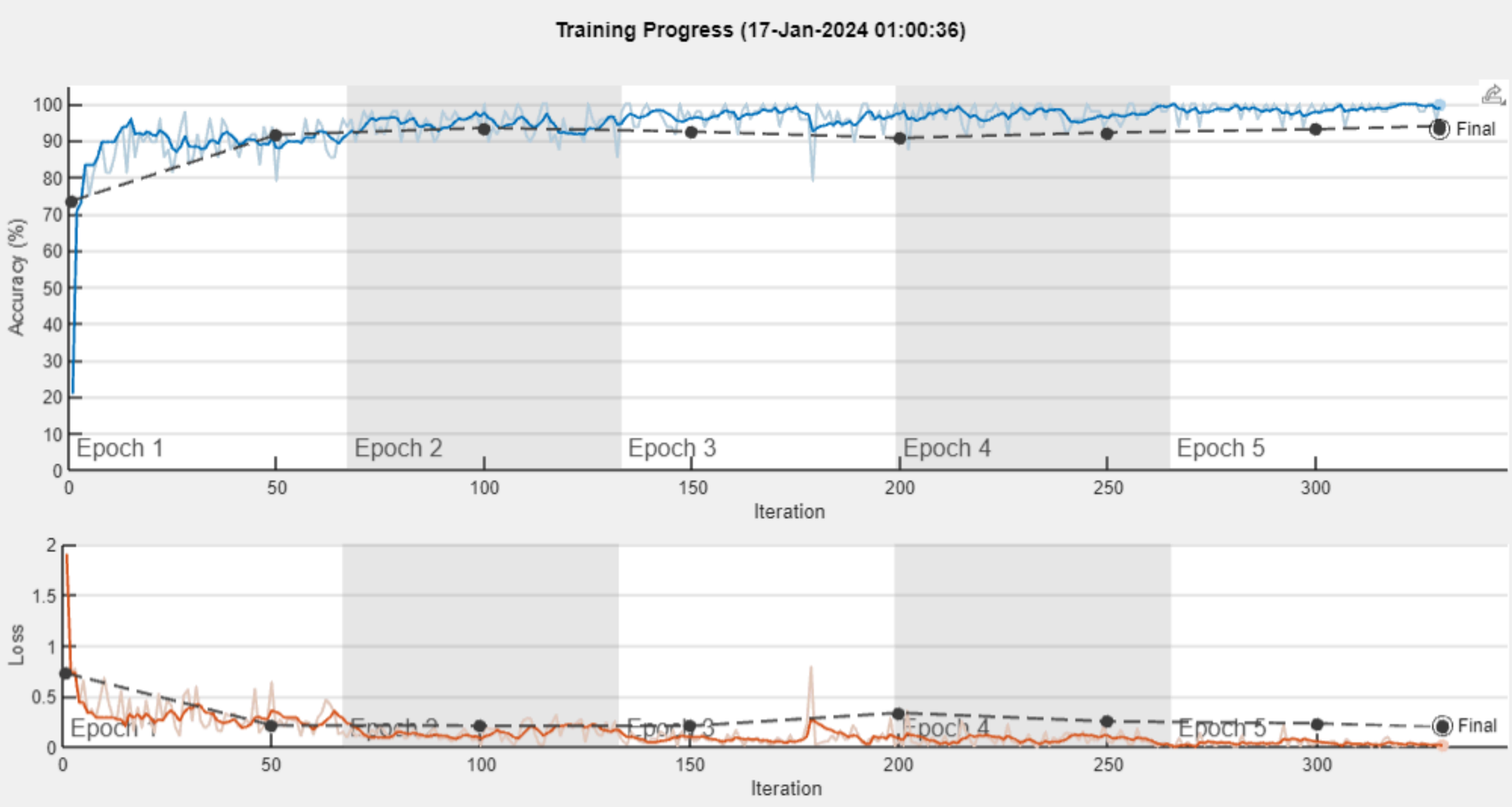
Pneumonia

CONVOLUTIONAL NEURAL NETWORKS (CNNS)

- **ShuffleNetV2:** Efficient network with reduced computational complexity
- **ResNet50:** Deep residual network with skip connections to improve learning
- **MobileNetV2:** Lightweight model optimized for mobile and edge devices

*All the models were trained using classification learner app in MATLAB, but equivalent python code is also provided.

TRAINING RESULTS (SHUFFLENET)-93.48% ACCURACY



Results

Validation accuracy:	93.46%
Training finished:	Max epochs completed

Training Time

Start time:	17-Jan-2024 01:00:36
Elapsed time:	55 min 2 sec

Training Cycle

Epoch:	5 of 5
Iteration:	330 of 330
Iterations per epoch:	66
Maximum iterations:	330

Validation

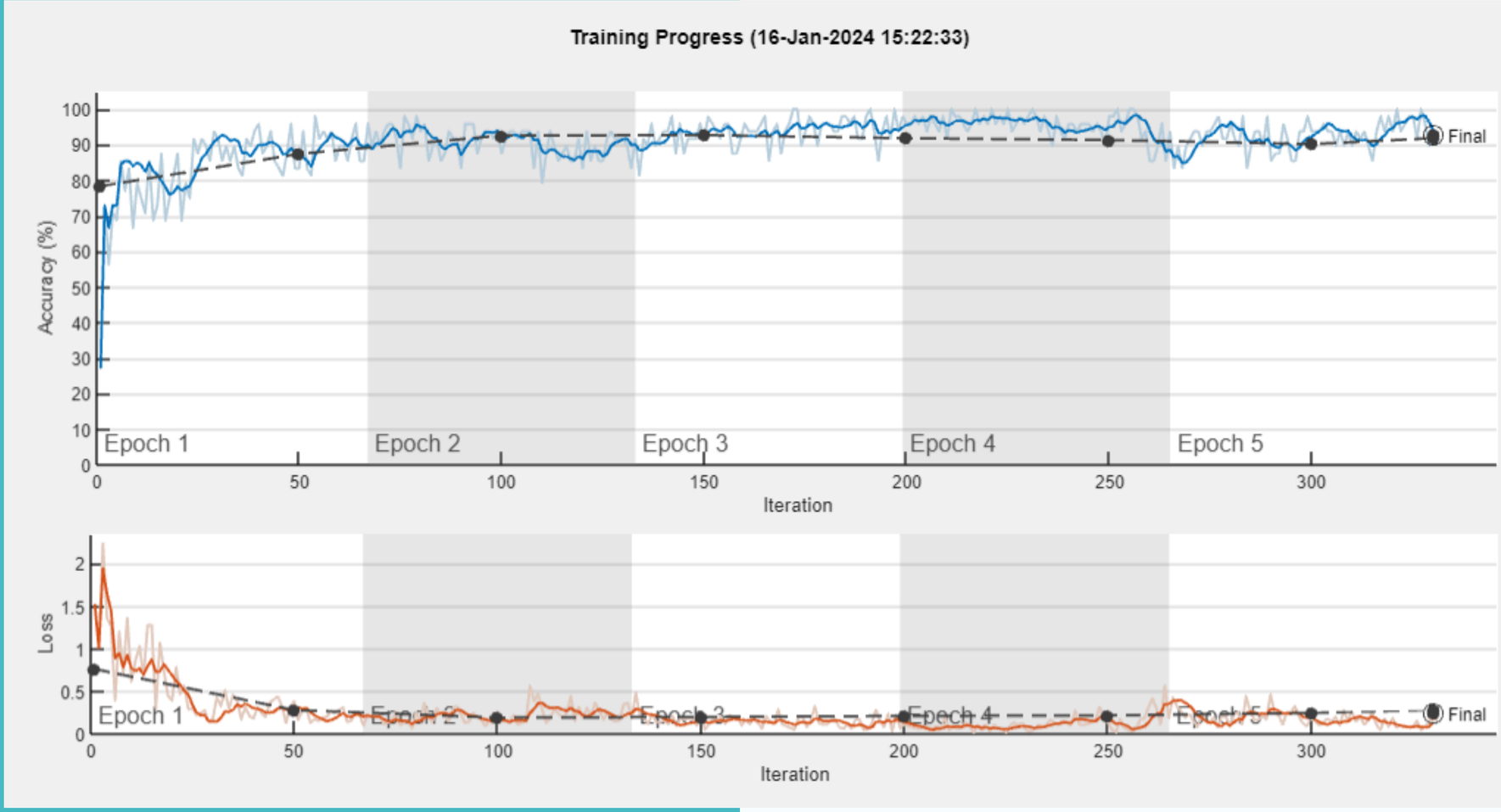
Frequency:	50 iterations

Other Information

Hardware resource:	Single CPU
Learning rate schedule:	Constant
Learning rate:	0.001

Accuracy

TRAINING RESULTS (RESNET18) -92.70% ACCURACY



Results

Validation accuracy:	92.70%
Training finished:	Max epochs completed

Training Time

Start time:	16-Jan-2024 15:22:33
Elapsed time:	71 min 43 sec

Training Cycle

Epoch:	5 of 5
Iteration:	330 of 330
Iterations per epoch:	66
Maximum iterations:	330

Validation

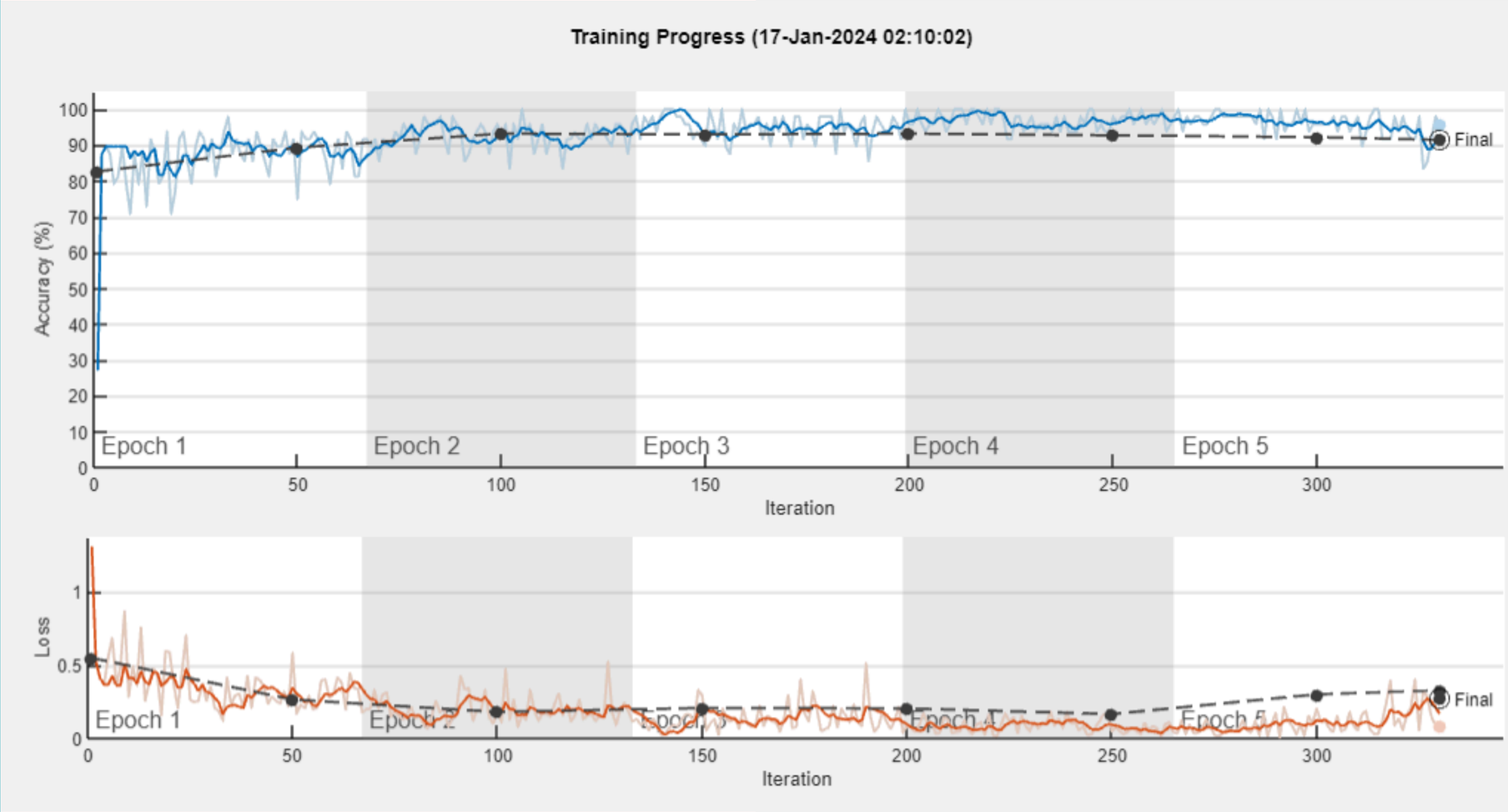
Frequency:	50 iterations

Other Information

Hardware resource:	Single CPU
Learning rate schedule:	Constant
Learning rate:	0.001

Accuracy

TRAINING RESULTS (MOBILENETV2) -91.70% ACCURACY



Results

Validation accuracy:	91.70%
Training finished:	Max epochs completed

Training Time

Start time:	17-Jan-2024 02:10:02
Elapsed time:	120 min 26 sec

Training Cycle

Epoch:	5 of 5
Iteration:	330 of 330
Iterations per epoch:	66
Maximum iterations:	330

Validation

Frequency:	50 iterations

Other Information

Hardware resource:	Single CPU
Learning rate schedule:	Constant
Learning rate:	0.001

Accuracy

THANK YOU