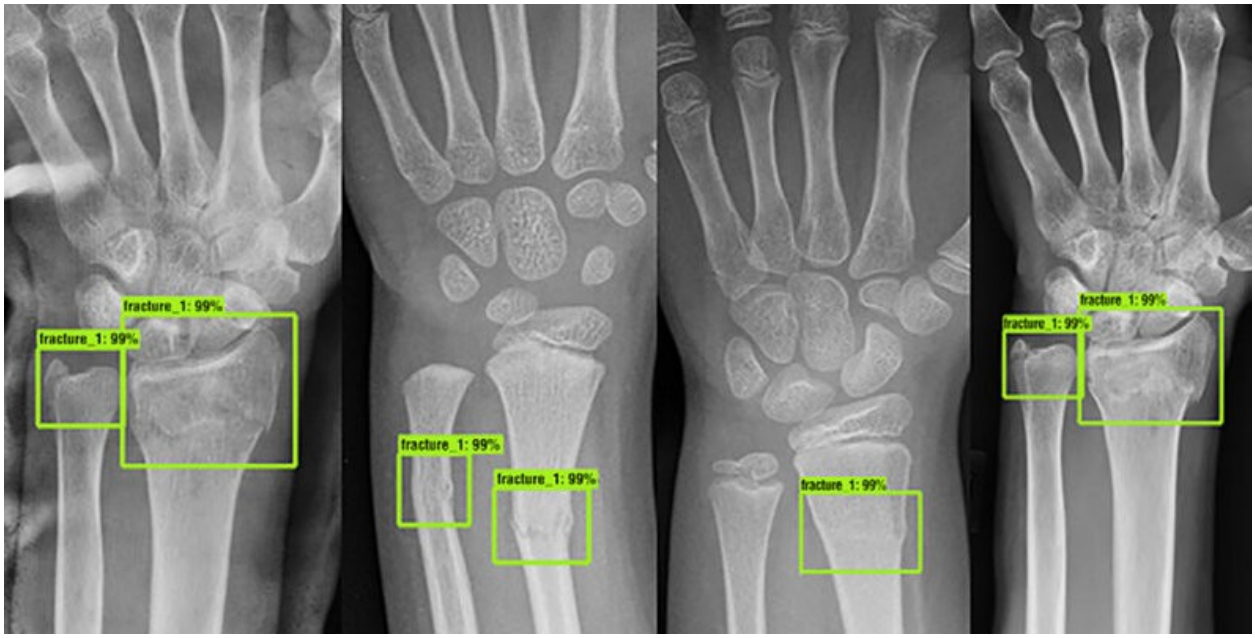
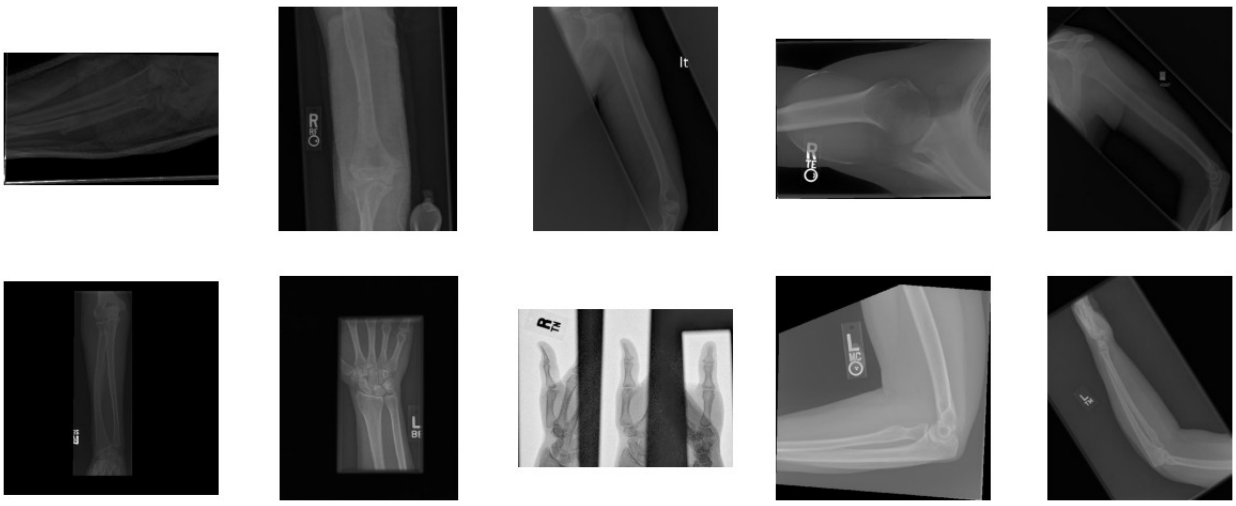
Bone Fracture Dataset



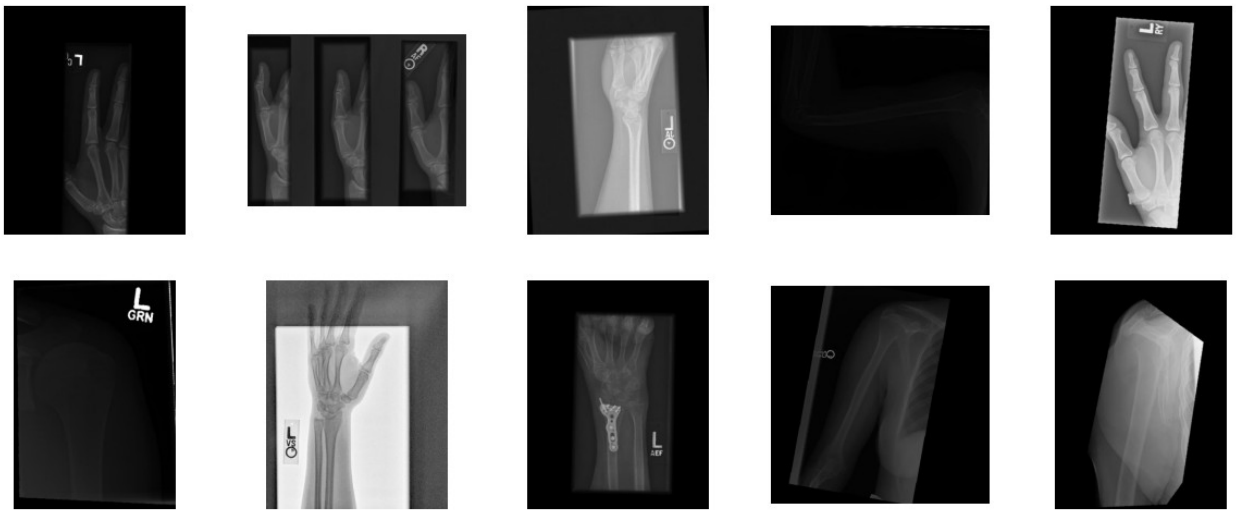

```
import matplotlib.pyplot as plt
import seaborn as sns
import random
import PIL
import PIL.Image

test_loc='/kaggle/input/bone-fracture-detection-computer-vision-
project/BoneFractureYolo8/test/images'
train_loc='/kaggle/input/bone-fracture-detection-computer-vision-
project/BoneFractureYolo8/train/images'
val_loc='/kaggle/input/bone-fracture-detection-computer-vision-
project/BoneFractureYolo8/valid/images'

from PIL import Image

def display_images(image_dir, num_images=10):

    image_files = [f for f in os.listdir(image_dir) if
f.endswith(('jpg', 'jpeg', 'png'))]

    if len(image_files) < num_images:
        num_images = len(image_files)
        print(f"Warning: Only {num_images} images available in
{image_dir}")

    selected_images = random.sample(image_files, num_images)
```

```
    cols = 5
    rows = (num_images + cols - 1) // cols

    plt.figure(figsize=(15, rows * 3))
    for i, image_file in enumerate(selected_images):
        img_path = os.path.join(image_dir, image_file)
        img = Image.open(img_path)
        plt.subplot(rows, cols, i + 1)
        plt.imshow(img)
        plt.axis('off')

    plt.show()

print("Displaying test images:")
display_images(test_loc)

print("Displaying train images:")
display_images(train_loc)

print("Displaying validation images:")
display_images(val_loc)
```

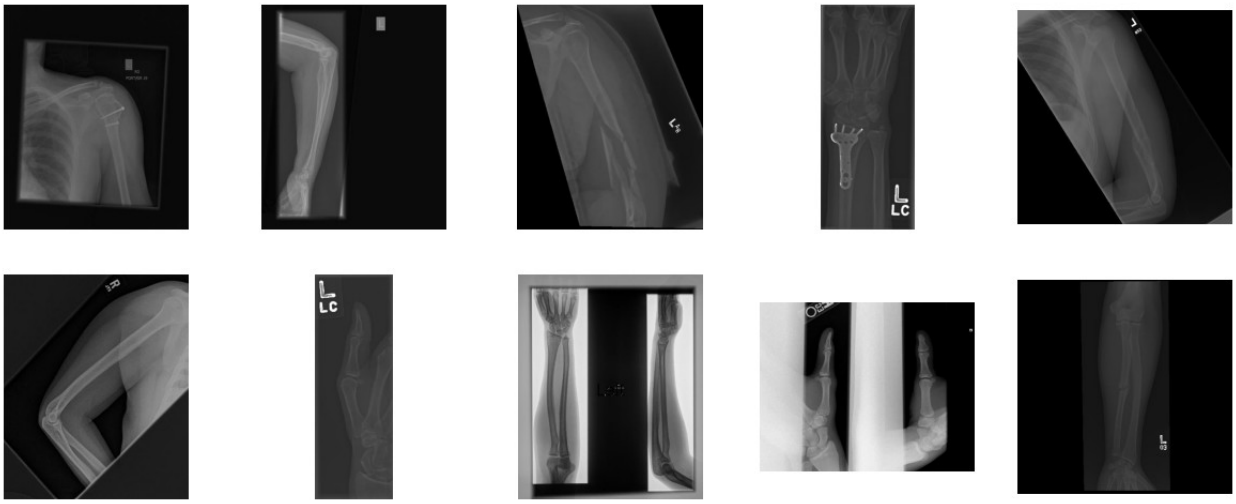
```
Displaying test images:
```



```
Displaying train images:
```



```
Displaying validation images:
```



```
import tensorflow as tf

print("Num GPUs Available: ",
len(tf.config.list_physical_devices('GPU')))
```

```
Num GPUs Available:  2
```

```
import torch
import torchvision
from torchvision import transforms, datasets
from torch import nn, optim

train_dir = '/kaggle/input/bone-fracture-detection-computer-vision-
project/BoneFractureYolo8/train/images'
val_dir = '/kaggle/input/bone-fracture-detection-computer-vision-
project/BoneFractureYolo8/valid/images'
```

```
from torch.utils.data import Dataset, DataLoader

import torchvision.models as models

class CustomImageDataset(Dataset):
    def __init__(self, image_dir, transform=None):
        self.image_dir = image_dir
        self.transform = transform
        self.image_files = [f for f in os.listdir(image_dir) if
f.endswith(('jpg', 'jpeg', 'png'))]

    def __len__(self):
        return len(self.image_files)

    def __getitem__(self, idx):
        img_name = os.path.join(self.image_dir, self.image_files[idx])
        image = Image.open(img_name).convert('RGB')

        if self.transform:
            image = self.transform(image)

        return image

transform = transforms.Compose([
    transforms.Resize((224, 224)),
    transforms.ToTensor()
])

train_loc = '/kaggle/input/bone-fracture-detection-computer-vision-
project/BoneFractureYolo8/train/images'
val_loc = '/kaggle/input/bone-fracture-detection-computer-vision-
project/BoneFractureYolo8/valid/images'
test_loc = '/kaggle/input/bone-fracture-detection-computer-vision-
project/BoneFractureYolo8/test/images'

train_dataset = CustomImageDataset(train_loc, transform=transform)
val_dataset = CustomImageDataset(val_loc, transform=transform)
test_dataset = CustomImageDataset(test_loc, transform=transform)

train_loader = DataLoader(train_dataset, batch_size=32, shuffle=True)
val_loader = DataLoader(val_dataset, batch_size=32, shuffle=False)
test_loader = DataLoader(test_dataset, batch_size=32, shuffle=False)

model = models.resnet18(pretrained=True)
model.fc = nn.Linear(model.fc.in_features, 1)
```

```
/opt/conda/lib/python3.10/site-packages/torchvision/models/
_utils.py:208: UserWarning: The parameter 'pretrained' is deprecated
since 0.13 and may be removed in the future, please use 'weights'
instead.
```

```
  warnings.warn(
/opt/conda/lib/python3.10/site-packages/torchvision/models/_utils.py:223: UserWarning: Arguments other than a weight enum or `None` for 'weights' are deprecated since 0.13 and may be removed in the future. The current behavior is equivalent to passing `weights=ResNet18_Weights.IMAGENET1K_V1`. You can also use `weights=ResNet18_Weights.DEFAULT` to get the most up-to-date weights.
  warnings.warn(msg)
Downloading: "https://download.pytorch.org/models/resnet18-f37072fd.pth" to /root/.cache/torch/hub/checkpoints/resnet18-f37072fd.pth
100%|██████████| 44.7M/44.7M [00:00<00:00, 171MB/s]
```

```
device = torch.device('cuda' if torch.cuda.is_available() else 'cpu')
model = model.to(device)

criterion = nn.BCEWithLogitsLoss()
optimizer = optim.Adam(model.parameters(), lr=0.001)

num_epochs = 10
for epoch in range(num_epochs):
    model.train()
    running_loss = 0.0
    for images in train_loader:
        images = images.to(device)

        labels = torch.ones(images.size(0)).to(device)

        outputs = model(images)
        loss = criterion(outputs.squeeze(), labels)

        optimizer.zero_grad()
        loss.backward()
        optimizer.step()

        running_loss += loss.item() * images.size(0)

    epoch_loss = running_loss / len(train_loader.dataset)
    print(f'Epoch {epoch+1}/{num_epochs}, Loss: {epoch_loss:.4f}')
```

```
Epoch 1/10, Loss: 0.0092
Epoch 2/10, Loss: 0.0001
Epoch 3/10, Loss: 0.0001
Epoch 4/10, Loss: 0.0000
Epoch 5/10, Loss: 0.0000
Epoch 6/10, Loss: 0.0000
Epoch 7/10, Loss: 0.0000
Epoch 8/10, Loss: 0.0000
Epoch 9/10, Loss: 0.0000
Epoch 10/10, Loss: 0.0000
```

```
model.eval()
with torch.no_grad():
    val_loss = 0.0
    for images in val_loader:
        images = images.to(device)
        labels = torch.ones(images.size(0)).to(device)

        outputs = model(images)
        loss = criterion(outputs.squeeze(), labels)
        val_loss += loss.item() * images.size(0)

    avg_val_loss = val_loss / len(val_loader.dataset)
    print(f'Validation Loss: {avg_val_loss:.4f}')
```

```
Validation Loss: 0.0000
```