In [2]:

```python
# bert_baseline_struct_full_metrics_updated.py

import math
import pandas as pd
import torch
import torch.nn as nn
from torch.utils.data import Dataset, DataLoader, random_split
from transformers import AutoTokenizer, AutoModel
from sklearn.preprocessing import StandardScaler
from tqdm import tqdm
from sklearn.metrics import (
    roc_auc_score, accuracy_score, precision_score, recall_score,
    f1_score, matthews_corrcoef, confusion_matrix
)
import matplotlib.pyplot as plt
import gc

# ── DATASET WITH STRUCTURED FEATURES ──────────────────────────────
class ICUTextStructDataset(Dataset):
    def __init__(self, csv_path, tokenizer_name, max_length, mode='both'):
        df = pd.read_csv(csv_path).reset_index(drop=True)
        # structured columns to include
        self.struct_cols = ['bun','calcium','creatinine','glucose','magnesium','sod
        # coerce to numeric, fill missing
        df[self.struct_cols] = (
            df[self.struct_cols]
              .apply(pd.to_numeric, errors='coerce')
              .fillna(0.0)
        )
        # standardize structured features
        scaler = StandardScaler()
        df[self.struct_cols] = scaler.fit_transform(df[self.struct_cols])
        self.data = df

        # tokenizer
        self.tokenizer = AutoTokenizer.from_pretrained(tokenizer_name)
        self.max_length = max_length
        self.mode = mode

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

    def __getitem__(self, idx):
        row = self.data.iloc[idx]
        text = str(row['text_note'])
        combined = str(row['combined_note'])
        if self.mode == 'text_only':
            full_text = text
        elif self.mode == 'combined_only':
            full_text = combined
        else:
            full_text = text + ' ' + combined

        enc = self.tokenizer(
```

```
            full_text,
            max_length=self.max_length,
            padding='max_length',
            truncation=True,
            return_tensors='pt'
        )
        # build structured features list explicitly as floats
        struct_list = [float(row[c]) for c in self.struct_cols]
        struct_feats = torch.tensor(struct_list, dtype=torch.float32)
        label = torch.tensor(row['mortality_label'], dtype=torch.float32)
        return {
            'input_ids':      enc['input_ids'].squeeze(0),
            'attention_mask': enc['attention_mask'].squeeze(0),
            'struct_feats':   struct_feats,
            'label':          label
        }

# ── MODEL WITH STRUCTURED MLP ──────────────────────────────────────
class BERTWithStruct(nn.Module):
    def __init__(self, encoder_name, struct_dim=7, bert_dim=768):
        super().__init__()
        self.encoder = AutoModel.from_pretrained(encoder_name)
        # MLP for structured features
        self.struct_mlp = nn.Sequential(
            nn.Linear(struct_dim, 32),
            nn.ReLU(),
            nn.Linear(32, 32)
        )
        # fusion classifier
        self.classifier = nn.Sequential(
            nn.Linear(bert_dim + 32, 128),
            nn.ReLU(),
            nn.Linear(128, 1)
        )

    def forward(self, input_ids, attention_mask, struct_feats):
        out = self.encoder(input_ids=input_ids, attention_mask=attention_mask)
        cls_emb = out.last_hidden_state[:, 0, :]       # (B, bert_dim)
        struct_emb = self.struct_mlp(struct_feats)     # (B, 32)
        x = torch.cat([cls_emb, struct_emb], dim=1)    # (B, bert_dim + 32)
        return self.classifier(x)                      # (B,1) logits

# ── METRICS CALCULATION ────────────────────────────────────────────
def compute_metrics(probs, labels):
    # calibrate threshold to match positive rate
    P = int(sum(labels))
    thr = sorted(probs, reverse=True)[P-1] if P > 0 else 1.0
    preds = [1 if p>=thr else 0 for p in probs]
    tn, fp, fn, tp = confusion_matrix(labels, preds).ravel()
    return {
        'auc': roc_auc_score(labels, probs),
        'accuracy': accuracy_score(labels, preds),
        'precision': precision_score(labels, preds, zero_division=0),
        'recall': recall_score(labels, preds, zero_division=0),
        'f1': f1_score(labels, preds, zero_division=0),
        'mcc': matthews_corrcoef(labels, preds),
```

```
        'specificity': tn/(tn+fp) if (tn+fp)>0 else 0.0,
        'npv': tn/(tn+fn) if (tn+fn)>0 else 0.0,
        'threshold': thr
    }

# ── TRAIN & EVAL LOOPS ──────────────────────────────────────────────
def train_epoch(model, loader, device, loss_fn, optimizer):
    model.train()
    total_loss = 0.0
    all_probs, all_labels = [], []
    for batch in tqdm(loader, desc="Train", leave=False):
        ids    = batch['input_ids'].to(device)
        mask   = batch['attention_mask'].to(device)
        struct = batch['struct_feats'].to(device)
        labels = batch['label'].to(device).unsqueeze(1)

        logits = model(ids, mask, struct)
        loss   = loss_fn(logits, labels)
        optimizer.zero_grad()
        loss.backward()
        optimizer.step()
        total_loss += loss.item()

        probs = torch.sigmoid(logits).cpu().squeeze().tolist()
        all_probs.extend(probs if isinstance(probs, list) else [probs])
        all_labels.extend(labels.cpu().squeeze().tolist())

    metrics = compute_metrics(all_probs, all_labels)
    metrics['loss'] = total_loss / len(loader)
    return metrics

def eval_epoch(model, loader, device, loss_fn):
    model.eval()
    total_loss = 0.0
    all_probs, all_labels = [], []
    with torch.no_grad():
        for batch in tqdm(loader, desc="Eval", leave=False):
            ids    = batch['input_ids'].to(device)
            mask   = batch['attention_mask'].to(device)
            struct = batch['struct_feats'].to(device)
            labels = batch['label'].to(device).unsqueeze(1)

            logits = model(ids, mask, struct)
            loss   = loss_fn(logits, labels)
            total_loss += loss.item()

            probs = torch.sigmoid(logits).cpu().squeeze().tolist()
            all_probs.extend(probs if isinstance(probs, list) else [probs])
            all_labels.extend(labels.cpu().squeeze().tolist())

    metrics = compute_metrics(all_probs, all_labels)
    metrics['loss'] = total_loss / len(loader)
    return metrics
```

In [1]:
```
# Fixed imports (added missing ones)
import re
```

```python
import math
from datetime import datetime
import torch
import torch.nn as nn
import torch.optim as optim
import numpy as np
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import roc_auc_score, accuracy_score, precision_score, recall_
import matplotlib.pyplot as plt
from torch.utils.data import Dataset, DataLoader, random_split
from tqdm import tqdm
from torch.nn.utils import clip_grad_norm_
from transformers import BertModel, BertTokenizer, AutoTokenizer, AutoModel
from torch.optim import AdamW
from torch.optim.lr_scheduler import ReduceLROnPlateau
import torch.cuda.amp

# Set random seeds for reproducibility
torch.manual_seed(42)
np.random.seed(42)

# 1. Enhanced Data Processing - Removed image feature handling
def load_and_preprocess_data(csv_path):
    df = pd.read_pickle(csv_path)

    structured_cols = ['bun', 'calcium', 'creatinine', 'glucose', 'magnesium', 'sod

    # Improved missing value handling
    for col in structured_cols:
        df[col] = pd.to_numeric(df[col], errors='coerce')
        df[f'{col}_missing'] = df[col].isna().astype(float)  # Missingness flags
        df[col] = df[col].fillna(0)

    scaler = StandardScaler()
    df[structured_cols] = scaler.fit_transform(df[structured_cols])

    # Add temporal features if available
    if 'charttime' in df:
        try:
            df['hour_of_day'] = pd.to_datetime(df['charttime']).dt.hour
            structured_cols.append('hour_of_day')
        except:
            print("Could not parse charttime for hour_of_day feature")

    df['mortality_label'] = pd.to_numeric(df['mortality_label'], errors='coerce').a

    class_counts = df['mortality_label'].value_counts()
    print(f"Class distribution: {class_counts.to_dict()}")
    print(f"Percentage of positive samples: {class_counts.get(1, 0) / len(df) * 100

    return df, structured_cols + [f'{col}_missing' for col in structured_cols]

# 2. Enhanced Dataset Class - Removed image features
class MultimodalDataset(Dataset):
```

```
    def __init__(self, df, structured_cols, tokenizer, max_length=512):
        self.df = df
        self.structured_cols = structured_cols
        self.tokenizer = tokenizer
        self.max_length = max_length
        self.section_pattern = re.compile(
            r'(IMPRESSION|ASSESSMENT|DIAGNOSIS|DISCHARGE SUMMARY):(.*?)(?=\n[A-Z]{2
            re.IGNORECASE | re.DOTALL
        )

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

    def _clean_text(self, text):
        text = str(text)
        # 1. Extract clinical sections
        sections = self.section_pattern.findall(text)
        clean_text = ' '.join([s[1].strip() for s in sections]) if sections else te

        # 2. Remove boilerplate and de-id artifacts
        clean_text = re.sub(r'\[\*\*.*?\*\*\]', '', clean_text)  # Remove [** **] p
        clean_text = re.sub(r'\s+', ' ', clean_text).strip()  # Normalize whitespac

        # 3. Prioritize recent info (last 2048 chars if long)
        return clean_text[-2048:] if len(clean_text) > 2048 else clean_text

    def __getitem__(self, idx):
        row = self.df.iloc[idx]

        # Text processing
        clean_text = self._clean_text(row['combined_note'])
        text_feat = self.tokenizer(
            clean_text,
            max_length=self.max_length,
            padding='max_length',
            truncation=True,
            return_tensors='pt'
        )

        # Structured data with missingness flags
        struct_data = [float(row[col]) for col in self.structured_cols]
        struct_feat = torch.tensor(struct_data, dtype=torch.float32)

        label = torch.tensor(float(row['mortality_label']), dtype=torch.float32)

        return {
            'input_ids': text_feat['input_ids'].squeeze(0),
            'attention_mask': text_feat['attention_mask'].squeeze(0),
            'struct_feat': struct_feat,
            'label': label
        }

# 3. Model Architecture - Removed image components
class TextStructFusionModel(nn.Module):
    def __init__(self, bert_model_name='bert-base-uncased', struct_dim=12, hidden_d
        super().__init__()
```

```
        self.bert = BertModel.from_pretrained(bert_model_name)
        self.bert_hidden_size = self.bert.config.hidden_size

        # Structured data projection
        self.struct_projection = nn.Sequential(
            nn.Linear(struct_dim, hidden_dim*2),
            nn.ReLU(),
            nn.Dropout(dropout_rate),
            nn.Linear(hidden_dim*2, hidden_dim)
        )

        # Attention mechanism now only between text and structured data
        self.attention = nn.Sequential(
            nn.Linear(self.bert_hidden_size + hidden_dim, hidden_dim),
            nn.Tanh(),
            nn.Linear(hidden_dim, 2),
            nn.Softmax(dim=1)
        )

        self.classifier = nn.Sequential(
            nn.Linear(self.bert_hidden_size + hidden_dim, hidden_dim),
            nn.ReLU(),
            nn.Dropout(dropout_rate),
            nn.Linear(hidden_dim, 1)
        )

    def forward(self, input_ids, attention_mask, struct_feat):
        bert_outputs = self.bert(input_ids=input_ids, attention_mask=attention_mask
        text_embed = bert_outputs.last_hidden_state[:, 0, :]

        struct_proj = self.struct_projection(struct_feat)

        combined = torch.cat([text_embed, struct_proj], dim=1)
        attention_weights = self.attention(combined)

        text_embed = text_embed * attention_weights[:, 0].unsqueeze(1)
        struct_proj = struct_proj * attention_weights[:, 1].unsqueeze(1)

        fused = torch.cat([text_embed, struct_proj], dim=1)
        return self.classifier(fused).squeeze()

# [Rest of the code remains the same, except for model instantiation]
# 4. Training Utilities (unchanged)
def compute_metrics(y_true, y_pred, threshold=0.5):
    y_pred = np.array(y_pred)
    y_pred_bin = (y_pred >= threshold).astype(int)
    return {
        'auc': roc_auc_score(y_true, y_pred),
        'accuracy': accuracy_score(y_true, y_pred_bin),
        'precision': precision_score(y_true, y_pred_bin, zero_division=0),
        'recall': recall_score(y_true, y_pred_bin, zero_division=0),
        'f1': f1_score(y_true, y_pred_bin, zero_division=0)
    }

def find_optimal_threshold(y_true, y_pred):
    thresholds = np.arange(0.1, 0.9, 0.05)
```

```
    best_threshold = 0.5
    best_f1 = 0
    for threshold in thresholds:
        f1 = f1_score(y_true, (y_pred >= threshold).astype(int), zero_division=0)
        if f1 > best_f1:
            best_f1 = f1
            best_threshold = threshold
    return best_threshold

# 5. Training Loop (modified to remove image features)
def train_model(model, train_loader, val_loader, criterion, optimizer, num_epochs=2
    model = model.to(device)
    history = {'train': [], 'val': []}
    best_f1 = 0.0
    patience = 5
    epochs_without_improvement = 0
    scaler = torch.cuda.amp.GradScaler()
    scheduler = ReduceLROnPlateau(optimizer, 'max', patience=2, factor=0.1)

    for epoch in range(num_epochs):
        model.train()
        train_preds, train_labels = [], []
        train_loss = 0

        for batch in tqdm(train_loader, desc=f"Epoch {epoch+1}/{num_epochs}"):
            optimizer.zero_grad()

            with torch.cuda.amp.autocast():
                outputs = model(
                    batch['input_ids'].to(device),
                    batch['attention_mask'].to(device),
                    batch['struct_feat'].to(device)
                )
                loss = criterion(outputs, batch['label'].to(device))

            scaler.scale(loss).backward()
            clip_grad_norm_(model.parameters(), clip_value)
            scaler.step(optimizer)
            scaler.update()

            train_loss += loss.item() * batch['input_ids'].size(0)
            train_preds.extend(torch.sigmoid(outputs.detach()).cpu().numpy())
            train_labels.extend(batch['label'].cpu().numpy())

        # Validation phase
        model.eval()
        val_preds, val_labels = [], []
        val_loss = 0

        with torch.no_grad():
            for batch in val_loader:
                outputs = model(
                    batch['input_ids'].to(device),
                    batch['attention_mask'].to(device),
                    batch['struct_feat'].to(device)
                )
```

```
                loss = criterion(outputs, batch['label'].to(device))

                val_loss += loss.item() * batch['input_ids'].size(0)
                val_preds.extend(torch.sigmoid(outputs).cpu().numpy())
                val_labels.extend(batch['label'].cpu().numpy())

        # Calculate metrics
        train_loss /= len(train_loader.dataset)
        val_loss /= len(val_loader.dataset)

        train_metrics = compute_metrics(train_labels, train_preds)
        val_metrics = compute_metrics(val_labels, val_preds)
        best_threshold = find_optimal_threshold(val_labels, val_preds)
        val_metrics_thresh = compute_metrics(val_labels, val_preds, best_threshold)

        # Store history
        history['train'].append({'loss': train_loss, **train_metrics})
        history['val'].append({
            'loss': val_loss,
            **val_metrics,
            'best_threshold': best_threshold,
            **val_metrics_thresh
        })

        # Update scheduler
        scheduler.step(val_metrics['f1'])

        # Print metrics
        print(f"\nEpoch {epoch+1}/{num_epochs}")
        print(f"Train Loss: {train_loss:.4f} | Val Loss: {val_loss:.4f}")
        print(f"Val AUC: {val_metrics['auc']:.4f} | Best Threshold: {best_threshold
        print(f"Val F1: {val_metrics_thresh['f1']:.4f} | Precision: {val_metrics_th
        print(f"Current LR: {optimizer.param_groups[0]['lr']:.2e}")

        if val_metrics_thresh['f1'] > best_f1:
            best_f1 = val_metrics_thresh['f1']
            epochs_without_improvement = 0
            torch.save({
                'model_state_dict': model.state_dict(),
                'threshold': best_threshold,
                'epoch': epoch
            }, "best_model.pth")
            print("Saved new best model!")


    return model, history

# 6. Evaluation Function (modified to remove image features)
def evaluate_model(model, loader, threshold, device):
    model.eval()
    preds, labels = [], []

    with torch.no_grad():
        for batch in tqdm(loader, desc="Evaluating"):
            outputs = model(
                batch['input_ids'].to(device),
```

```
                batch['attention_mask'].to(device),
                batch['struct_feat'].to(device)
            )
            preds.extend(torch.sigmoid(outputs).cpu().numpy())
            labels.extend(batch['label'].cpu().numpy())

    metrics = compute_metrics(np.array(labels), np.array(preds), threshold)

    print(f"\nEvaluation Results (Threshold={threshold:.2f}):")
    print(f"AUC: {metrics['auc']:.4f}")
    print(f"Accuracy: {metrics['accuracy']:.4f}")
    print(f"Precision: {metrics['precision']:.4f}")
    print(f"Recall: {metrics['recall']:.4f}")
    print(f"F1 Score: {metrics['f1']:.4f}")

    return metrics

# 7. Main Execution (modified to use new model)
def main():
    device = torch.device("cuda" if torch.cuda.is_available() else "cpu")
    print(f"Using device: {device}")

    # Data loading
    df, structured_cols = load_and_preprocess_data("final_image_feats.pkl")
    tokenizer = BertTokenizer.from_pretrained('bert-base-uncased')

    # Data splits
    train_df, test_df = train_test_split(df, test_size=0.2, random_state=42, strati
    train_df, val_df = train_test_split(train_df, test_size=0.25, random_state=42,

    print(f"\nData splits:")
    print(f"Train: {len(train_df)} samples")
    print(f"Val: {len(val_df)} samples")
    print(f"Test: {len(test_df)} samples")

    # Datasets and DataLoaders
    batch_size = 16
    train_dataset = MultimodalDataset(train_df, structured_cols, tokenizer)
    val_dataset = MultimodalDataset(val_df, structured_cols, tokenizer)
    test_dataset = MultimodalDataset(test_df, structured_cols, tokenizer)

    train_loader = DataLoader(train_dataset, batch_size=batch_size, shuffle=True, p
    val_loader = DataLoader(val_dataset, batch_size=batch_size, shuffle=False, pin_
    test_loader = DataLoader(test_dataset, batch_size=batch_size, shuffle=False, pi

    # Handle class imbalance
    class_counts = train_df['mortality_label'].value_counts()
    pos_weight = torch.tensor([class_counts[0] / class_counts[1]], device=device)
    criterion = nn.BCEWithLogitsLoss(pos_weight=pos_weight)

    # Model and optimizer - using the new model without image features
    model = TextStructFusionModel(
        bert_model_name='bert-base-uncased',
        struct_dim=len(structured_cols)
    )
```

```
    optimizer = AdamW([
        {'params': model.bert.parameters(), 'lr': 2e-5},
        {'params': [p for n, p in model.named_parameters() if 'bert' not in n], 'lr
    ], weight_decay=1e-4)

    # Training
    model, history = train_model(
        model=model,
        train_loader=train_loader,
        val_loader=val_loader,
        criterion=criterion,
        optimizer=optimizer,
        num_epochs=100,
        device=device
    )

    # Evaluation
    checkpoint = torch.load("best_model.pth", weights_only=False)
    model.load_state_dict(checkpoint['model_state_dict'])
    test_metrics = evaluate_model(model, test_loader, checkpoint['threshold'], devi

    # Plotting
    plt.figure(figsize=(12, 8))
    metrics = ['loss', 'auc', 'f1', 'accuracy']
    for i, metric in enumerate(metrics, 1):
        plt.subplot(2, 2, i)
        plt.plot([x[metric] for x in history['train']], label='Train')
        plt.plot([x[metric] for x in history['val']], label='Val')
        plt.title(metric.upper())
        plt.xlabel('Epoch')
        plt.legend()
    plt.tight_layout()
    plt.savefig('training_history.png')
    plt.show()

if __name__ == "__main__":
    main()
```

```
Using device: cuda
Class distribution: {0: 1069, 1: 91}
Percentage of positive samples: 7.84%

Data splits:
Train: 696 samples
Val: 232 samples
Test: 232 samples
/tmp/ipykernel_3352046/2366890266.py:187: FutureWarning: `torch.cuda.amp.GradScaler
(args...)` is deprecated. Please use `torch.amp.GradScaler('cuda', args...)` instea
d.
  scaler = torch.cuda.amp.GradScaler()
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(ar
gs...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 1/100: 100%|██████████| 44/44 [00:09<00:00,  4.72it/s]
```

```
Epoch 1/100
Train Loss: 1.2507 | Val Loss: 1.0640
Val AUC: 0.9037 | Best Threshold: 0.45
Val F1: 0.4500 | Precision: 0.4091 | Recall: 0.5000
Current LR: 2.00e-05
Saved new best model!
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 2/100: 100%|██████████| 44/44 [00:08<00:00,  4.89it/s]
Epoch 2/100
Train Loss: 0.9114 | Val Loss: 0.5866
Val AUC: 0.9613 | Best Threshold: 0.75
Val F1: 0.7333 | Precision: 0.9167 | Recall: 0.6111
Current LR: 2.00e-05
Saved new best model!
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 3/100: 100%|██████████| 44/44 [00:08<00:00,  4.90it/s]
Epoch 3/100
Train Loss: 0.5017 | Val Loss: 0.9816
Val AUC: 0.9881 | Best Threshold: 0.10
Val F1: 0.8824 | Precision: 0.9375 | Recall: 0.8333
Current LR: 2.00e-05
Saved new best model!
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 4/100: 100%|██████████| 44/44 [00:08<00:00,  4.90it/s]
Epoch 4/100
Train Loss: 0.5697 | Val Loss: 1.0668
Val AUC: 0.9940 | Best Threshold: 0.45
Val F1: 0.8750 | Precision: 1.0000 | Recall: 0.7778
Current LR: 2.00e-05
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 5/100: 100%|██████████| 44/44 [00:08<00:00,  4.93it/s]
Epoch 5/100
Train Loss: 0.6563 | Val Loss: 3.6323
Val AUC: 0.9888 | Best Threshold: 0.10
Val F1: 0.8387 | Precision: 1.0000 | Recall: 0.7222
Current LR: 2.00e-05
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 6/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
```

```
Epoch 6/100
Train Loss: 0.5355 | Val Loss: 1.9117
Val AUC: 0.9899 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-05
Saved new best model!
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 7/100: 100%|██████████| 44/44 [00:08<00:00,  4.93it/s]
Epoch 7/100
Train Loss: 0.9057 | Val Loss: 4.0021
Val AUC: 0.9948 | Best Threshold: 0.10
Val F1: 0.8000 | Precision: 1.0000 | Recall: 0.6667
Current LR: 2.00e-05
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 8/100: 100%|██████████| 44/44 [00:08<00:00,  4.93it/s]
Epoch 8/100
Train Loss: 0.6500 | Val Loss: 1.2731
Val AUC: 0.9940 | Best Threshold: 0.10
Val F1: 0.9412 | Precision: 1.0000 | Recall: 0.8889
Current LR: 2.00e-05
Saved new best model!
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 9/100: 100%|██████████| 44/44 [00:08<00:00,  4.93it/s]
Epoch 9/100
Train Loss: 0.3549 | Val Loss: 1.5361
Val AUC: 0.9958 | Best Threshold: 0.10
Val F1: 0.9412 | Precision: 1.0000 | Recall: 0.8889
Current LR: 2.00e-05
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 10/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 10/100
Train Loss: 0.4568 | Val Loss: 2.7084
Val AUC: 0.9930 | Best Threshold: 0.10
Val F1: 0.8750 | Precision: 1.0000 | Recall: 0.7778
Current LR: 2.00e-05
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 11/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
```

```
Epoch 11/100
Train Loss: 0.3898 | Val Loss: 2.3106
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.8750 | Precision: 1.0000 | Recall: 0.7778
Current LR: 2.00e-06
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 12/100: 100%|██████████| 44/44 [00:08<00:00,  4.93it/s]
Epoch 12/100
Train Loss: 0.4109 | Val Loss: 2.2777
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.8750 | Precision: 1.0000 | Recall: 0.7778
Current LR: 2.00e-06
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 13/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 13/100
Train Loss: 0.3706 | Val Loss: 2.0123
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-06
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 14/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 14/100
Train Loss: 0.3957 | Val Loss: 1.9304
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-07
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 15/100: 100%|██████████| 44/44 [00:08<00:00,  4.93it/s]
Epoch 15/100
Train Loss: 0.3731 | Val Loss: 1.9220
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-07
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 16/100: 100%|██████████| 44/44 [00:08<00:00,  4.93it/s]
Epoch 16/100
Train Loss: 0.3596 | Val Loss: 1.9171
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-07
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 17/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 17/100
Train Loss: 0.3799 | Val Loss: 1.9099
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-08
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 18/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 18/100
Train Loss: 0.3641 | Val Loss: 1.9095
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-08
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 19/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 19/100
Train Loss: 0.3918 | Val Loss: 1.9091
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-08
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 20/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 20/100
Train Loss: 0.4065 | Val Loss: 1.9089
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 21/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 21/100
Train Loss: 0.3966 | Val Loss: 1.9089
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 22/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 22/100
Train Loss: 0.4029 | Val Loss: 1.9088
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 23/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 23/100
Train Loss: 0.3345 | Val Loss: 1.9088
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 24/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 24/100
Train Loss: 0.3946 | Val Loss: 1.9088
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 25/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 25/100
Train Loss: 0.3561 | Val Loss: 1.9088
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 26/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 26/100
Train Loss: 0.3573 | Val Loss: 1.9087
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 27/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 27/100
Train Loss: 0.3840 | Val Loss: 1.9087
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 28/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 28/100
Train Loss: 0.3812 | Val Loss: 1.9087
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 29/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 29/100
Train Loss: 0.3857 | Val Loss: 1.9086
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 30/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 30/100
Train Loss: 0.3161 | Val Loss: 1.9086
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 31/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 31/100
Train Loss: 0.3513 | Val Loss: 1.9086
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 32/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 32/100
Train Loss: 0.3709 | Val Loss: 1.9086
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 33/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 33/100
Train Loss: 0.3777 | Val Loss: 1.9086
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 34/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 34/100
Train Loss: 0.3861 | Val Loss: 1.9085
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 35/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 35/100
Train Loss: 0.3439 | Val Loss: 1.9085
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 36/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 36/100
Train Loss: 0.3956 | Val Loss: 1.9085
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 37/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 37/100
Train Loss: 0.3789 | Val Loss: 1.9084
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 38/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 38/100
Train Loss: 0.3543 | Val Loss: 1.9084
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 39/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 39/100
Train Loss: 0.3579 | Val Loss: 1.9084
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 40/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 40/100
Train Loss: 0.3984 | Val Loss: 1.9084
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 41/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 41/100
Train Loss: 0.3921 | Val Loss: 1.9080
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 42/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 42/100
Train Loss: 0.3666 | Val Loss: 1.9080
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 43/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 43/100
Train Loss: 0.3620 | Val Loss: 1.9079
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 44/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 44/100
Train Loss: 0.3811 | Val Loss: 1.9079
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 45/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 45/100
Train Loss: 0.3861 | Val Loss: 1.9079
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 46/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 46/100
Train Loss: 0.3778 | Val Loss: 1.9079
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 47/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 47/100
Train Loss: 0.3717 | Val Loss: 1.9078
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 48/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 48/100
Train Loss: 0.3675 | Val Loss: 1.9078
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 49/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 49/100
Train Loss: 0.3938 | Val Loss: 1.9075
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 50/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 50/100
Train Loss: 0.4037 | Val Loss: 1.9075
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 51/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 51/100
Train Loss: 0.3532 | Val Loss: 1.9075
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 52/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 52/100
Train Loss: 0.3651 | Val Loss: 1.9075
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 53/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 53/100
Train Loss: 0.3881 | Val Loss: 1.9074
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 54/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 54/100
Train Loss: 0.3859 | Val Loss: 1.9074
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 55/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 55/100
Train Loss: 0.4076 | Val Loss: 1.9073
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 56/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 56/100
Train Loss: 0.3761 | Val Loss: 1.9073
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 57/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 57/100
Train Loss: 0.3516 | Val Loss: 1.9072
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 58/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 58/100
Train Loss: 0.3991 | Val Loss: 1.9072
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 59/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 59/100
Train Loss: 0.3755 | Val Loss: 1.9072
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 60/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 60/100
Train Loss: 0.3981 | Val Loss: 1.9072
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 61/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 61/100
Train Loss: 0.3642 | Val Loss: 1.9072
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 62/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 62/100
Train Loss: 0.3323 | Val Loss: 1.9072
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 63/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 63/100
Train Loss: 0.3817 | Val Loss: 1.9071
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 64/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 64/100
Train Loss: 0.3990 | Val Loss: 1.9072
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 65/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 65/100
Train Loss: 0.4590 | Val Loss: 1.9072
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 66/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 66/100
Train Loss: 0.3833 | Val Loss: 1.9071
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 67/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 67/100
Train Loss: 0.3496 | Val Loss: 1.9071
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 68/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 68/100
Train Loss: 0.4074 | Val Loss: 1.9070
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 69/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 69/100
Train Loss: 0.3484 | Val Loss: 1.9070
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 70/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 70/100
Train Loss: 0.3885 | Val Loss: 1.9070
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 71/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 71/100
Train Loss: 0.3621 | Val Loss: 1.9070
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 72/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 72/100
Train Loss: 0.3536 | Val Loss: 1.9069
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 73/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 73/100
Train Loss: 0.3709 | Val Loss: 1.9069
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 74/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 74/100
Train Loss: 0.3692 | Val Loss: 1.9069
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 75/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 75/100
Train Loss: 0.3560 | Val Loss: 1.9068
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 76/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 76/100
Train Loss: 0.3671 | Val Loss: 1.9068
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 77/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 77/100
Train Loss: 0.3319 | Val Loss: 1.9068
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 78/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 78/100
Train Loss: 0.3662 | Val Loss: 1.9067
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 79/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 79/100
Train Loss: 0.3923 | Val Loss: 1.9067
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 80/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 80/100
Train Loss: 0.3475 | Val Loss: 1.9067
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 81/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 81/100
Train Loss: 0.3859 | Val Loss: 1.9066
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 82/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 82/100
Train Loss: 0.3404 | Val Loss: 1.9066
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 83/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 83/100
Train Loss: 0.3454 | Val Loss: 1.9064
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 84/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 84/100
Train Loss: 0.3707 | Val Loss: 1.9064
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 85/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 85/100
Train Loss: 0.3337 | Val Loss: 1.9064
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 86/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 86/100
Train Loss: 0.3492 | Val Loss: 1.9063
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 87/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 87/100
Train Loss: 0.3808 | Val Loss: 1.9063
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 88/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 88/100
Train Loss: 0.3400 | Val Loss: 1.9063
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 89/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 89/100
Train Loss: 0.3693 | Val Loss: 1.9062
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 90/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 90/100
Train Loss: 0.3305 | Val Loss: 1.9062
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 91/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 91/100
Train Loss: 0.3905 | Val Loss: 1.9062
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 92/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 92/100
Train Loss: 0.3925 | Val Loss: 1.9061
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 93/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 93/100
Train Loss: 0.3870 | Val Loss: 1.9061
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 94/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 94/100
Train Loss: 0.3808 | Val Loss: 1.9061
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 95/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 95/100
Train Loss: 0.3619 | Val Loss: 1.9060
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 96/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 96/100
Train Loss: 0.3891 | Val Loss: 1.9060
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
```

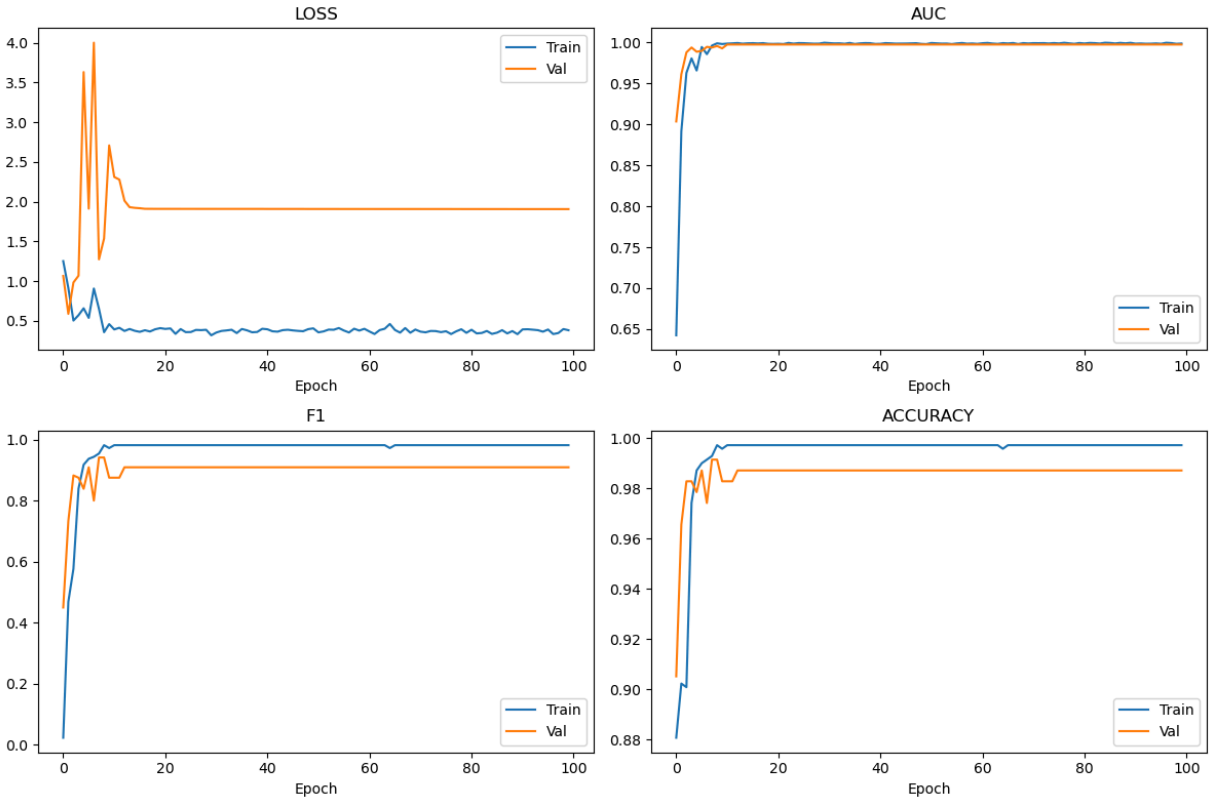
```
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 97/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 97/100
Train Loss: 0.3316 | Val Loss: 1.9060
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 98/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 98/100
Train Loss: 0.3443 | Val Loss: 1.9060
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 99/100: 100%|██████████| 44/44 [00:08<00:00,  4.92it/s]
Epoch 99/100
Train Loss: 0.3947 | Val Loss: 1.9059
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
/tmp/ipykernel_3352046/2366890266.py:198: FutureWarning: `torch.cuda.amp.autocast(args...)` is deprecated. Please use `torch.amp.autocast('cuda', args...)` instead.
  with torch.cuda.amp.autocast():

poch 100/100: 100%|██████████| 44/44 [00:08<00:00,  4.91it/s]
Epoch 100/100
Train Loss: 0.3800 | Val Loss: 1.9059
Val AUC: 0.9977 | Best Threshold: 0.10
Val F1: 0.9091 | Precision: 1.0000 | Recall: 0.8333
Current LR: 2.00e-09
valuating: 100%|██████████| 15/15 [00:02<00:00,  5.36it/s]
Evaluation Results (Threshold=0.10):
AUC: 0.9935
Accuracy: 0.9871
Precision: 0.8947
Recall: 0.9444
F1 Score: 0.9189
```


LOSS
Train
Val
Epoch
AUC
Train
Val
Epoch
F1
Train
Val
Epoch
ACCURACY
Train
Val
Epoch

In [ ]: