

MULTI-DOMAIN FUSION DEEPPFAKE DETECTION

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Introduction:

- ◆ The Deepfake Threat
- ◆ Current Limitations
- ◆ The Goal

Problem Statement:

- ◆ Reality Gap
- ◆ Adversarial Vulnerability
- ◆ Rapid Evolution

Objectives:

- ◆ Multi-Domain Framework
- ◆ Robustness & Generalization
- ◆ Detection over Localization

Literature Review:

- ◆ CNN-Based Methods
- ◆ Frequency Domain
- ◆ Vision Transformers
- ◆ Hybrid Models

System Architecture:

- Stage 1: Metadata Generation
- Stage 2: Preprocessing
- Stage 3: Feature Extraction
- Stage 4: Fusion & Classification

Implementation

- ▣ Spatial (XceptionNet)
- ▣ Frequency (FFT)
- ▣ Semantic (DINOv2)
- ▣ Feature Management

Results & Discussion:

◆ Single-Domain Performance:

Frequency domain achieved 88.56% accuracy..

Semantic domain achieved 79.27% accuracy.

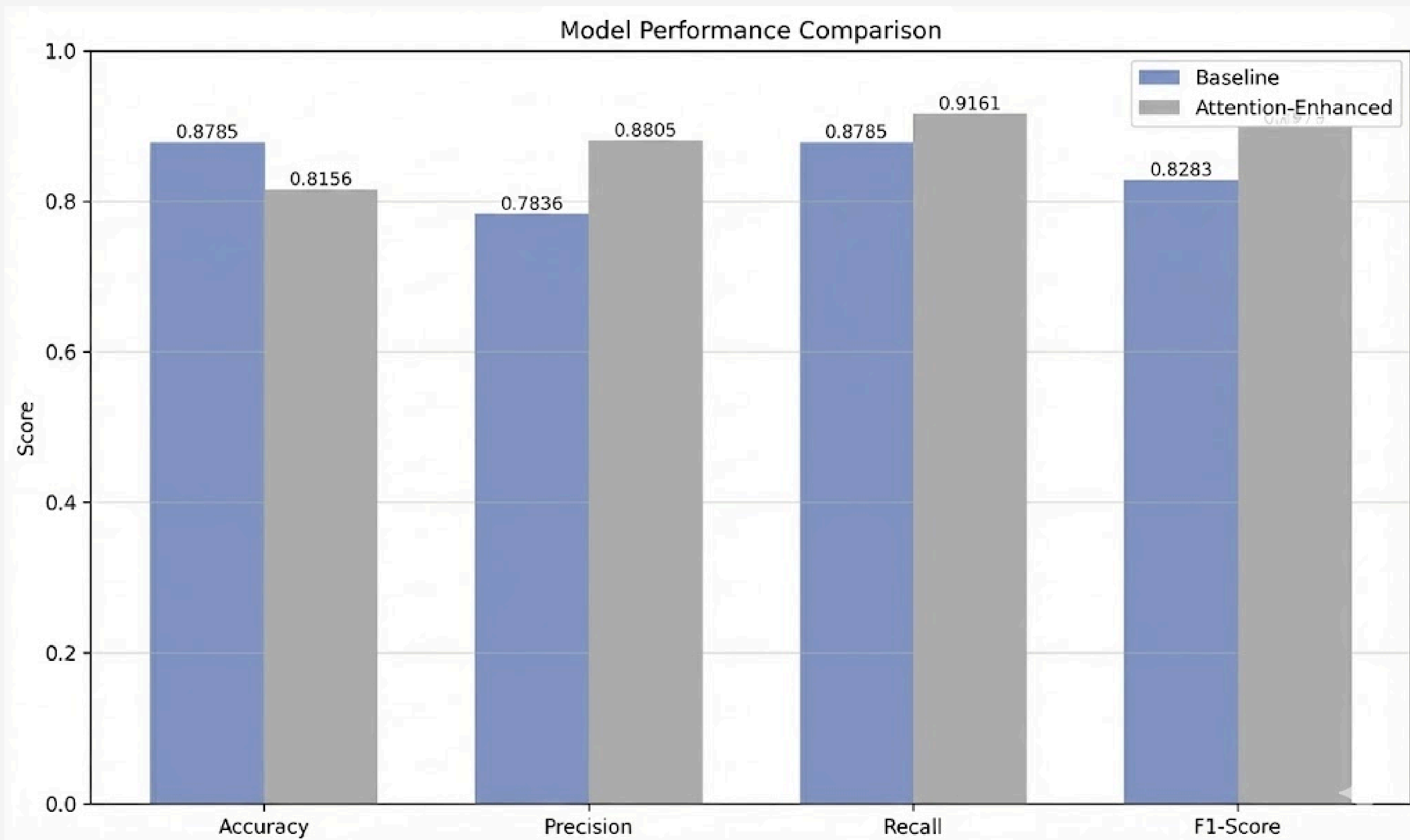
Spatial domain achieved 67.98% accuracy.

◆ Fusion Results:

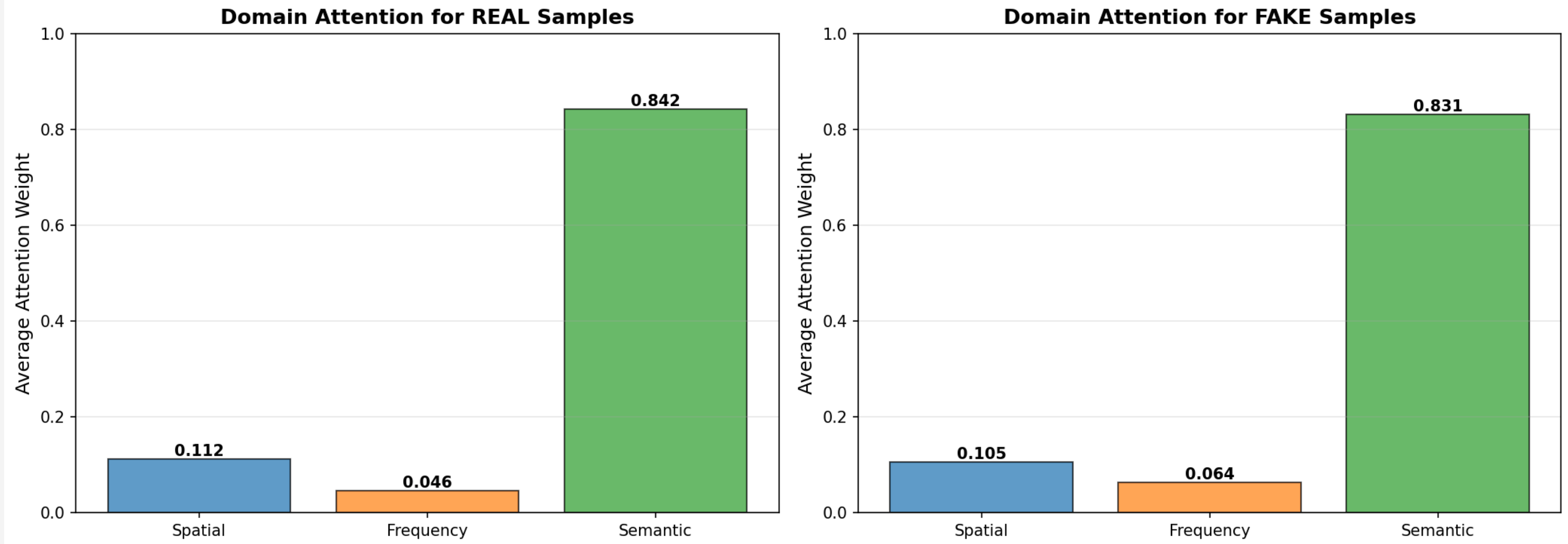
Concatenated fusion achieved 87.85% accuracy and a 82.83% F1-score.

◆ Cross-Attention Mechanism Results:

Cross-attention mechanism achieved 81.56% accuracy and a 89.79% F1-score.



Domain Attention



Future Work

- ◆ Scale Up FaceForensics++ Dataset
- ◆ Integrate Additional Datasets
- ◆ Evaluation and Benchmarking

Thank You