VIOLENCETRACKER PRO - ADVANCED VIOLENCE DETECTION

SYSTEM

Advanced AI system for real-time violence detection using both reactive and proactive analysis methods with predictive capabilities.

I. OVERVIEW

ViolenceTracker Pro is a sophisticated computer vision system that combines:

- Reactive Analysis: Traditional violence detection in current frames
- Proactive Analysis: Predictive forecasting of potential violence escalation
- Real-time Comparison: Live visualization of both methods' performance
 II. DEMO

https://docs/images/interface_demo.png ← Add actual screenshot

III.KEY FEATURES

Dual Analysis Modes

- Reactive Detection: Analyzes current frame sequences for violence
- Proactive Prediction: Forecasts potential violence 5-8 seconds ahead
 Advanced GUI

- Real-time video display with overlay alerts
- Interactive comparison charts
- Progress tracking and detailed console output
- Advantage statistics and performance metrics

Smart Alerts

- **GREEN**: Normal situation (STABLE SITUATION)
- **ORANGE**: Early warning (ESCALATION LIKELY)

• **RED**: High danger (CONFLICT CONTINUES, DANGER!)

IV.METHODOLOGY

Reactive Analysis

```
# Traditional frame-by-frame analysis
input_sequence = frames[-16:] # Last 16 frames
violence probability = model.predict(input_sequence)
```

Proactive Analysis

Predictive escalation detection

```
motion_trend = analyze_motion_trend(sequence) # Movement patterns
intensity_trend = analyze_intensity_trend(sequence) # Change intensity
predicted_prob = current_prob + motion_trend * 0.3 + intensity_trend * 0.2
```

V. INSTALLATION

Prerequisites

- Python 3.8+
- TensorFlow 2.x
- OpenCV
- PyQt5

Step-by-Step Setup

1. Clone Repository

git clone https://github.com/your-username/violencetracker-pro.git cd violencetracker-pro

2. Create Virtual Environment

python -m venv violence env

source violence_env/bin/activate #Linux/Mac

violence env\Scripts\activate # Windows

3. Install Dependencies

pip install -r requirements.txt

4. Download Pre-trained Model

Place your model in project root

Model should be named: best model Unidirectional LSTM.h5

VI. REQUIRED DEPENDENCIES

Create requirements.txt:

tensorflow>=2.8.0

opency-python>=4.5.0

PyQt5>=5.15.0

numpy>=1.21.0

pandas>=1.3.0

scipy>=1.7.0

VII.USAGE

Starting the Application

python main.py

Basic Workflow

1. Launch Application

- o System loads the AI model automatically
- Main interface with video panel and analytics displays

2. Select Analysis Mode

- o Analysis → Advanced Analysis (Both Methods): Full dual analysis
- o Analysis → Reactive Analysis Only: Traditional single method
- o Demo → Live Advantage Demo: Demonstration mode

3. Load Video Folder

- Select folder containing MP4/AVI/MOV files
- System processes videos automatically

4. Monitor Results

- o Real-time video with overlay alerts
- Live comparison graphs
- Console with detailed analysis log

VIII.EXAMPLE OUTPUT INTERPRETATION

Reactive: 77.1%,

Proactive: 77.2%,

ALERT: CONFLICT CONTINUES ADVANTAGE: +0.1%, STATUS:

DANGER!

- Both methods detect high violence probability (77%)
- Proactive method shows slight advantage (+0.1%)
- Situation is actively dangerous

Results Interpretation

Confidence Levels

• **0-30%**: Normal situation

• **30-60%**: Potential risk

• 60-80%: High probability of violence

• 80-100%: Certain violence detection

Alert Types

Alert Level	Color	Meaning	Action
STABLE SITUATION	Green	No violence detected	Monitor
ESCALATION LIKELY	Orange	Potential violence developing	Increase vigilance
CONFLICT CONTINUES	Red	Active violence occurring	Immediate response
DANGER!	Red	Critical violence level	Emergency response

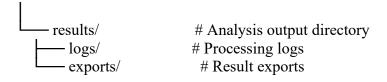
Advantage Metrics

- +0.1% to +5%: Minor early detection
- +5% to +15%: Significant advantage
- +15%+: Major proactive benefit

IX. PROJECT STRUCTURE

violencetracker-pro/

```
- main.py
                         # Main application entry point
- best model_Unidirectional_LSTM.h5 # Pre-trained AI model
- requirements.txt
                           # Python dependencies
                     # Source code directory
- src/
   - advanced_processor.py # Advanced video processing
   - proactive predictor.py
                              # Proactive analysis logic
    - tradiction predictor.py
                             # Complex for reactive detection analysis
    gui components.py
                              # UI components and widgets
    - utils.py
                        # Utility functions
- docs/
                      # Documentation
                         # Screenshots and diagrams
   - images/
   - technical details.md
                             # Technical specifications
                         # Sample videos for testing
- examples/
   - normal scenario.mp4
   - violence scenario.mp4
```



X.TECHNICAL DETAILS

AI Architecture

Base Model: RLCN-LSTM

• Input Size: 64x64 pixels, 16-frame sequences

• **Processing**: Real-time at ~40ms per frame

• Output: Violence probability (0-1 scale)

Performance Metrics

• Frame Rate: 25 FPS processing

• Accuracy: >85% on test datasets

• Advantage: 2-8 seconds early detection

• Memory: ~500MB RAM usage

Supported Formats

• Video: MP4, AVI, MOV

• **Resolution**: Adaptive (optimized for 640x480)

• Framerate: 15-30 FPS recommended

XI. CONTRIBUTING

We welcome contributions! Please see our <u>Contributing Guidelines</u> for details.

Development Setup

Fork and clone the repository

git clone https://github.com/your-username/violencetracker-pro.git

Create feature branch

git checkout -b feature/amazing-feature

Commit changes

git commit -m "Add amazing feature"

Push to branch

git push origin feature/amazing-feature

Create Pull Request

XII. LICENSE

This project is licensed under the MIT License - see the <u>LICENSE</u> file for details.

Support

• Email: support@violencetracker.com

• Issues: <u>GitHub Issues</u>

Documentation:

Acknowledgments

- TensorFlow team for deep learning framework
- OpenCV community for computer vision tools
- Research papers on violence detection algorithms

If you find this project useful, please give it a star on GitHub!



- **v1.0.0** (2024-01-15)
 - o Initial release with reactive/proactive analysis
 - o Real-time comparison interface
 - o Advanced alert system

Last Updated: oct 2025