National College of Ireland

Configuration Manual

MSc Research Project
Data Analytics

Ashish Negi
Student ID: x23237198

School of Computing
National College of Ireland

Supervisor: Mr. Aaloka Anant

National College of Ireland

MSc Project Submission Sheet

School of Computing

Student Name:	Ashish Negi		
Student ID:	X23237198		
Programme:	M.Sc Data Analytics	**Year:**	2024
Module:	M.Sc Research Project		
Supervisor:	Mr. Aaloka Anant		
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Project Title:	Configuration Manual		
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Signature:	Ashish Negi
Date:	12/12/2024

PLEASE READ THE FOLLOWING INSTRUCTIONS AND CHECKLIST

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Enhancing Surveillance Security Through Violence Detection Using Advanced Deep Learning Algorithms

Ashish Negi

X23237198

1. Introduction

This manual provides detailed steps to set up and run the Violence Detection System. The system allows users to upload videos and determines if the content depicts violent or non-violent activities.

2. Software and Hardware Specifications

Hardware Requirements:

- Processor – Intel Core i5/i7 or Apple M1/M2
- RAM – Minimum 16 GB
- Storage – Minimum 256 SSD/HDD
- GPU – NVIDIA GPU with CUDA support
- Internet – Stable Internet connection for downloading datasets, libraries, and using Google Colab resources

Software Requirements:

- Python v3.10 and above
- Google Colab
- Anaconda Navigator

First Part: To access and Execute the Main Program

To execute the modal application to know if the video input to the program result in correct output please follow the given below steps

System Requirements

Ensure the following are installed and set up on your system:

1. Python 3.10 or later
2. Required Python Libraries, please install if not available:
    - Flask
    - CV2
    - Werkzeug
    - Tensorflow

Verify Python version:

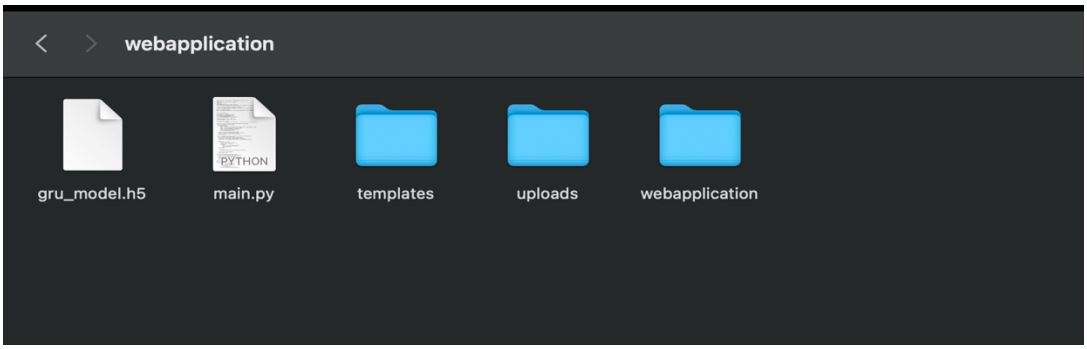
```
(base) ashishnegi@Ashishs-MacBook-Air webapplication % python --version
Python 3.11.5
(base) ashishnegi@Ashishs-MacBook-Air webapplication %
```

STEPS TO START THE APPLICATION

1. **Download** the complete folder containing the code and artefacts in your local machine.
   Maintain the following folder structure for the application to work correctly:

   webapplication/
   |-- main.py
   |-- gru_model.h5
   |-- templates/
   |-- index.html
   |-- result.html
   |-- uploads/ (Automatically created for uploaded videos)

```
(base) ashishnegi@Ashishs-MacBook-Air webapplication % ls -l
total 755152
-rw-rw-rw-@ 1 ashishnegi  staff  386630464 Nov 10 17:28 gru_model.h5
-rw-rw-rw-@ 1 ashishnegi  staff       3518 Dec 11 16:54 main.py
drwxrwxrwx@ 4 ashishnegi  staff        128 Nov 10 17:49 templates
drwxrwxrwx@ 2 ashishnegi  staff         64 Dec 11 13:49 uploads
drwxr-xr-x  3 ashishnegi  staff         96 Dec 11 16:54 webapplication
(base) ashishnegi@Ashishs-MacBook-Air webapplication %
```

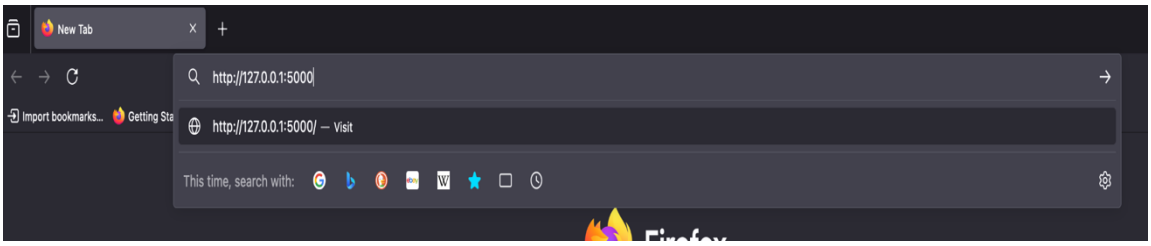


2. **Running the Program**
   - Navigate to the project directory in your local CMD or Terminal:
     cd /path/to/webapplication

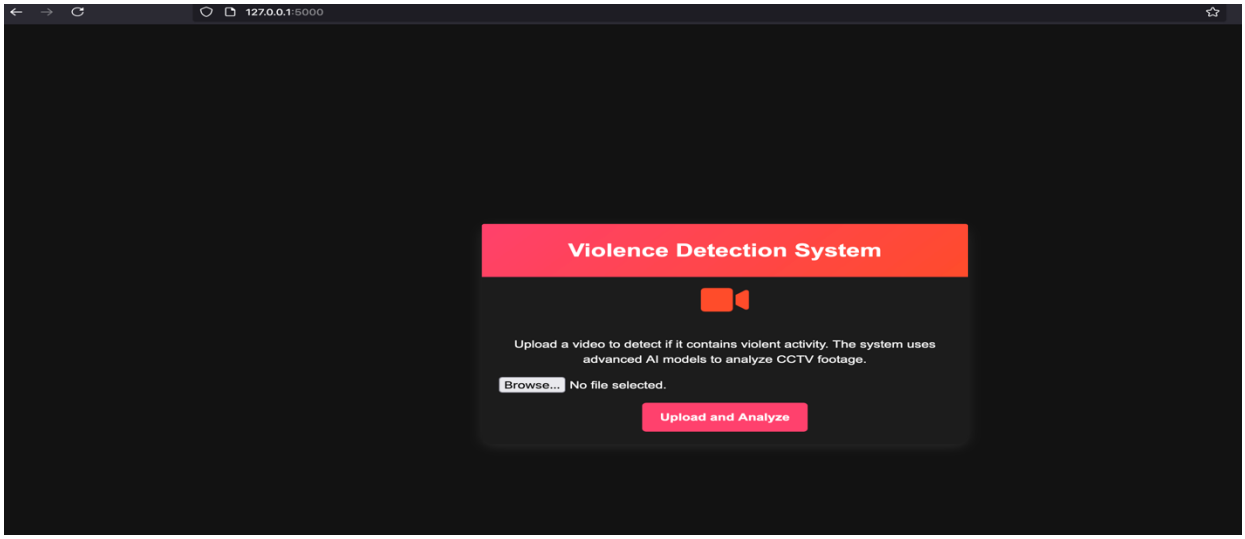
   - Execute the program:
     python main.py

```
(base) ashishnegi@Ashishs-MacBook-Air webapplication % python main.py
WARNING:absl:Compiled the loaded model, but the compiled metrics have yet to be built. `model.compile_metrics` will be empty until you train or evaluate the model.
 * Serving Flask app 'main'
 * Debug mode: on
INFO:werkzeug:WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
INFO:werkzeug:Press CTRL+C to quit
INFO:werkzeug: * Restarting with watchdog (fsevents)
WARNING:absl:Compiled the loaded model, but the compiled metrics have yet to be built. `model.compile_metrics` will be empty until you train or evaluate the model.
WARNING:werkzeug: * Debugger is active!
INFO:werkzeug: * Debugger PIN: 966-063-815
```

3. Open the web application in your browser at http://127.0.0.1:5000/



4. UI appears prompting to browse and upload video

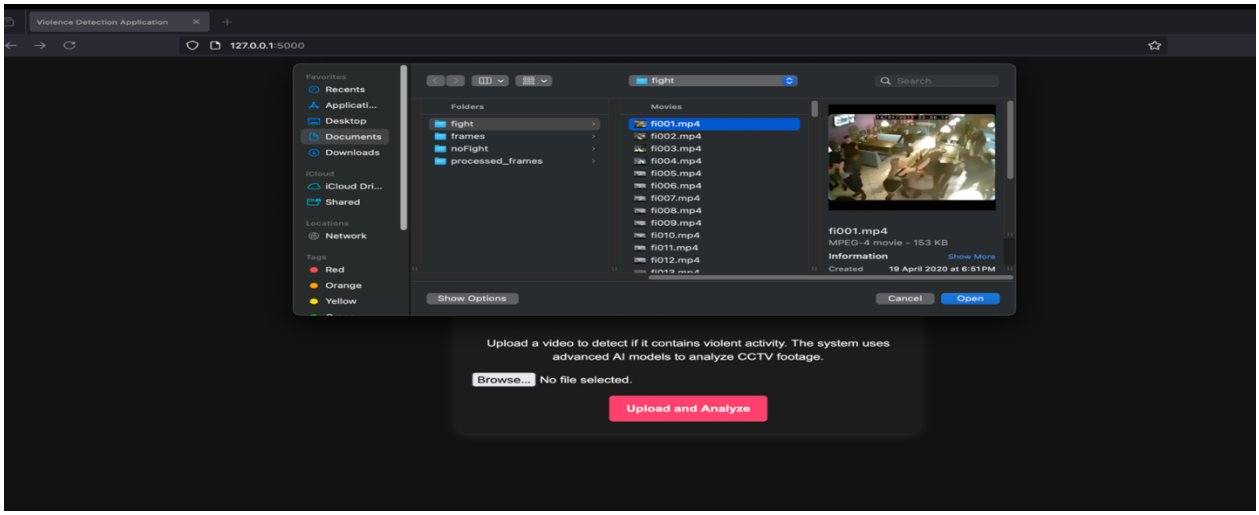


Using the Application

Follow these steps to analyse a video:

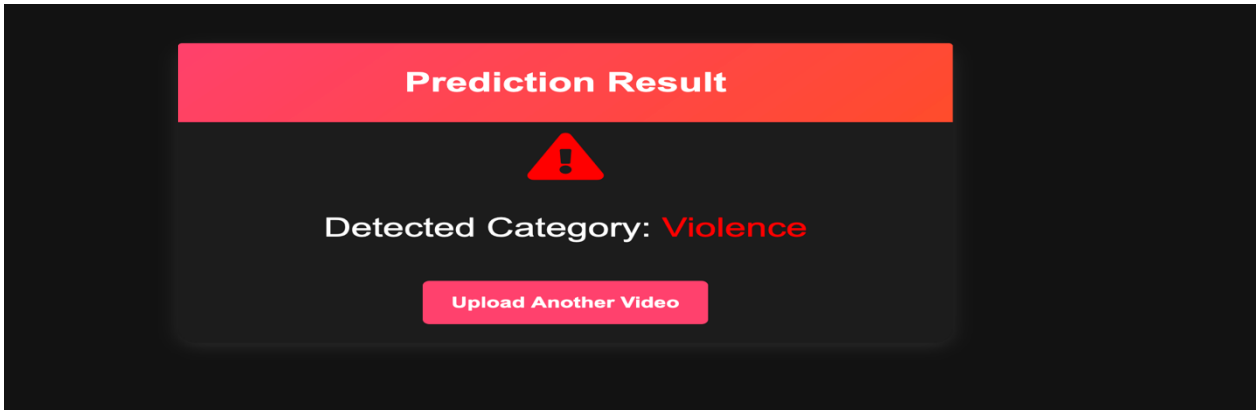
Step 1: Select a Fight Video

Upload a video that depicts violent activity (sample videos will be available in the data artefacts folder)



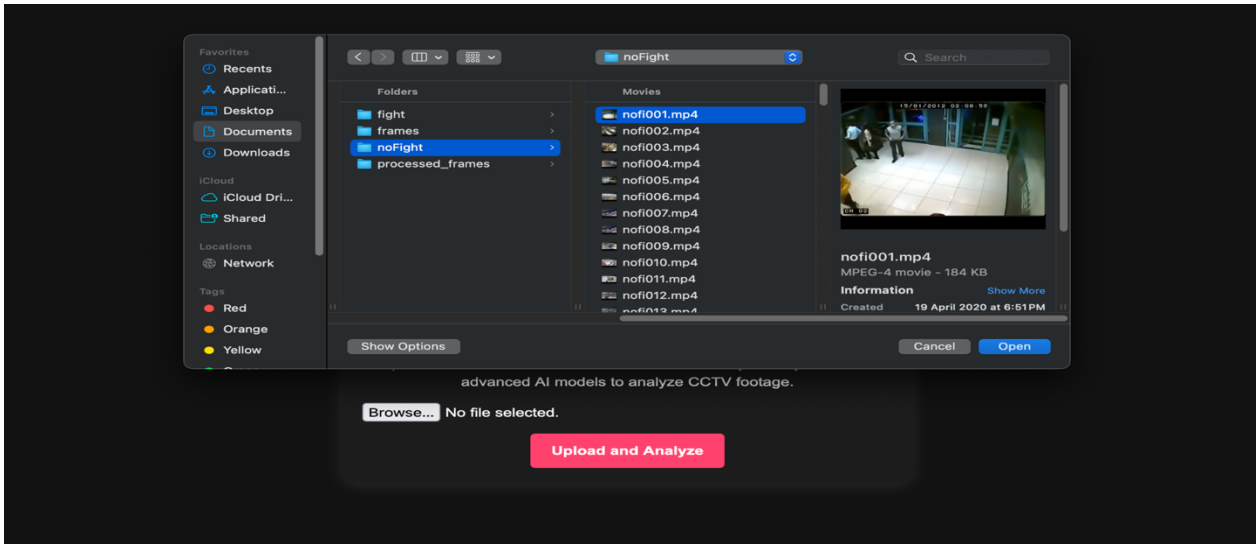
Step 2: Analyze Fight Video

The system will detect violence and display the result.



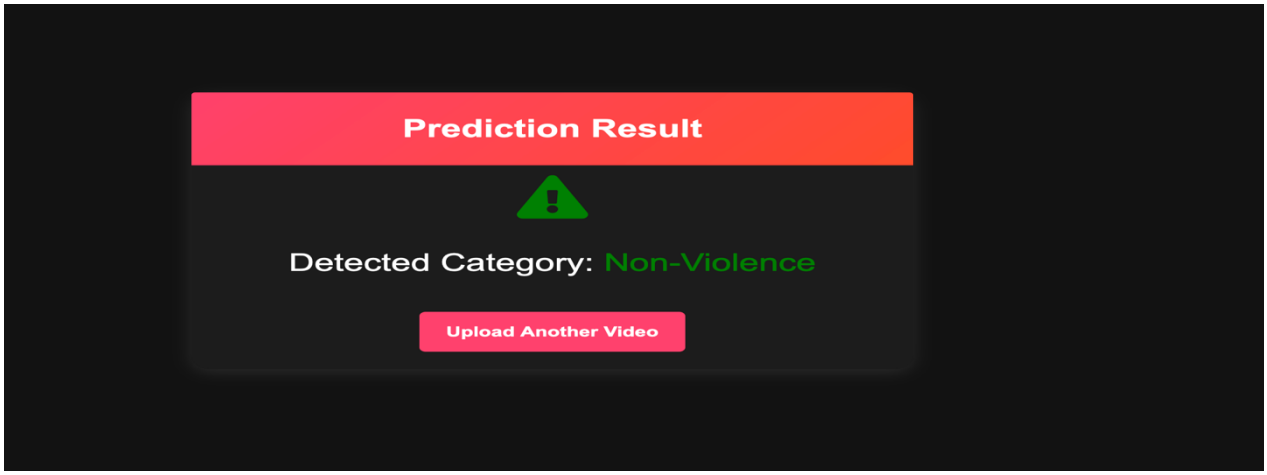
Step 3: Select a Non-Fight Video

Upload a video that depicts non-violent activity.



Step 4: Analyze Non-Fight Video

The system will detect no violence and display the result.



Second Part: To access the model's source code and analyse its insights

Open Google Colab in your browser to access the Model creation notebook

Step 1: Download the ModelCreation folder to the local drive.

Step 2: Upload the ModelCreation folder from your local drive to your google drive.

Step 3: Access the violence_detection.ipynb notebook from inside the ModelCreation folder, the file will open into the new Google Colabortory tab.

Step 4: To execute and initiating the model creation kindly connect with heavy duty hardware accelerator like A100 GPU.

Step 5: Kindly change the path of folders mentioned in "Define Paths and Create Necessary Directories" section to your respective drive path leading to the directories.

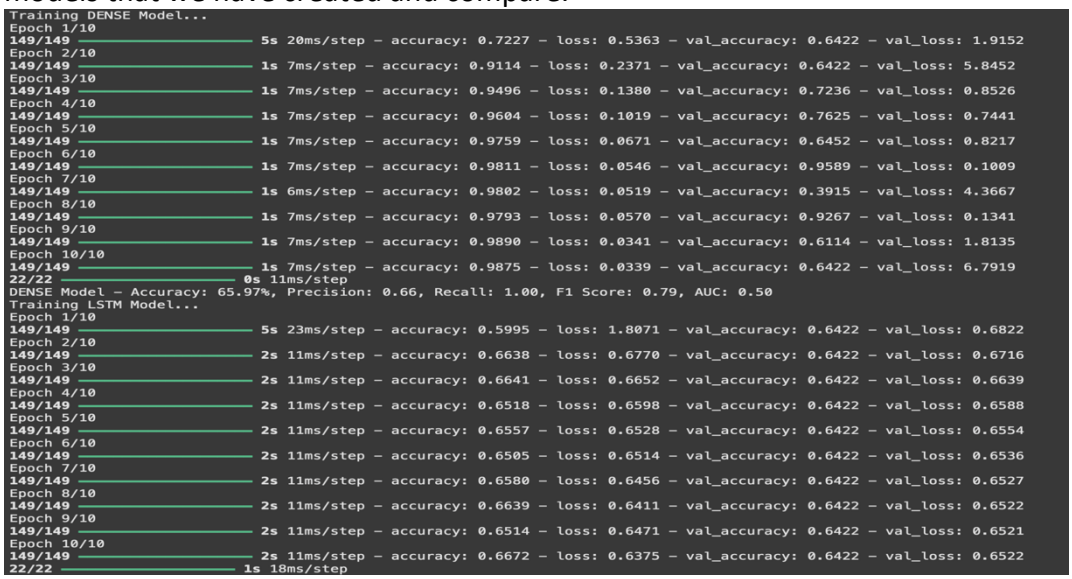
Step 6: Click on the 'Runtime' tab and then select 'Run all.' Since Google Colab comes with pre-installed libraries, there is no need to download additional libraries to execute the code.

Step 7: Wait for some time till the execution proceeds and create and train your models.

Step 8: After successfully creating the models, browse through the various insights provided by the code.

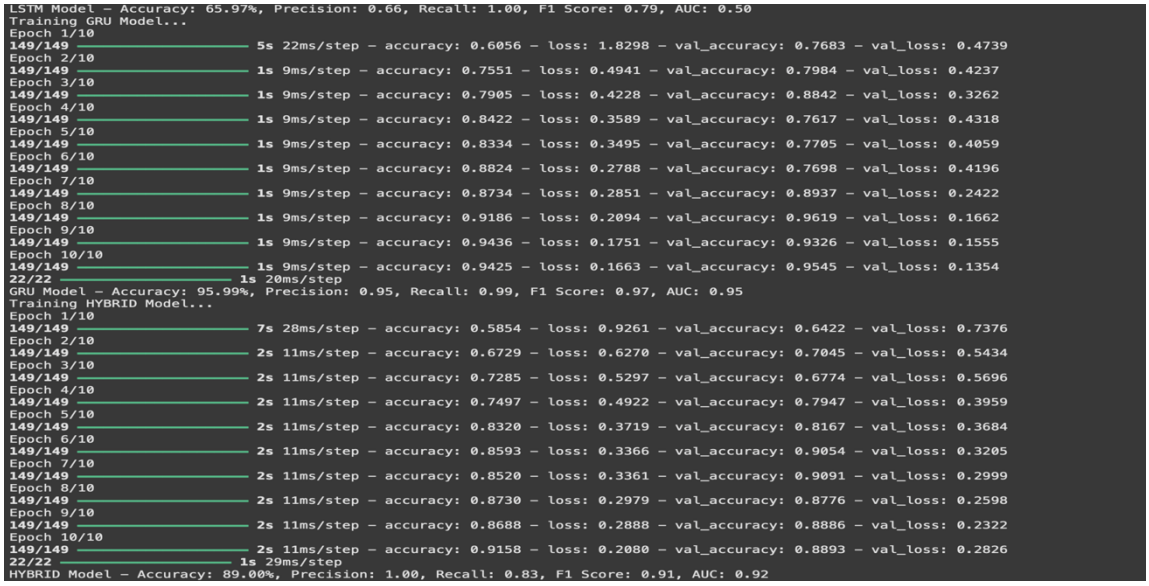
Model Accuracy, Precision, Recall, F1-Score, and AUC for Dense and LSTM Models

The following screenshot shows the training performance metrics for Dense and LSTM models that we have created and compare.



Model Accuracy, Precision, Recall, F1-Score, and AUC for GRU and Hybrid Models

The following screenshot shows the training performance metrics for GRU and Hybrid models created and compared.



Browse more for complete insights the model has provided

Conclusion:

By following the steps provided, user will be able to navigate through the application and examine the insights generated by various models used in the project's preparation.