

# DATS6303\_10 - Project Proposal

Group 3

## 1. Problem Selection

We have chosen the problem of “Violence Detection” in videos because it provides an opportunity to explore challenging aspects of video analysis using deep learning. This problem involves detecting specific patterns in video sequences and labeling them as either violent or non-violent.

## 2. Dataset

We will use the **Real Life Violence Situations Dataset**, which contains 1,000 labeled videos each for violent and non-violent scenarios. The dataset is sufficiently large to train a deep learning model as it contains diverse examples with different lighting, environments, and actions, providing good generalization potential.

## 3. Deep Network

We plan to use a pretrained R3D\_18 (ResNet 3D) architecture as the backbone for our deep network. This network is well-suited for video analysis due to its ability to capture spatiotemporal features. We will use the standard form of the network but will fine-tune the last layers to adapt it for our binary classification task (violence vs. non-violence). If necessary, we will customize the network to handle specific aspects of the dataset.

## 4. Framework

We will use the **PyTorch framework** for implementing the network. PyTorch is well-suited for video-based deep learning projects due to its dynamic computation graph and efficient support for 3D convolutional layers. Its flexibility allows us to experiment with custom layers and architectures.

## 5. Reference Materials

To gain sufficient background knowledge, we will refer to:

- Documentation for the PyTorch framework and the torchvision library, particularly its video models.
- Online resources and videos on spatiotemporal feature extraction in videos.

## 6. Performance Metrics

The performance of our network will be judged using the following metrics:

- **Accuracy:** The percentage of correctly classified clips.
- **F1-Score:** To measure the harmonic mean of precision and recall.

## 7. Schedule

Here is our rough schedule for completing the project:

- **Week 1-2:** Literature review, dataset exploration, and preprocessing.
- **Week 3-4:** Implementation of the chosen deep network architecture. Training and fine-tuning the network.

- **Week 5:** Evaluating the model and generating performance metrics.
- **Week 6:** Finalizing the report and preparing the presentation.