

Human Scream Detection

Group Members :

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Role of the project



The Human Scream Detection Dataset focuses on identifying and analyzing human screams, crucial for developing machine learning models in security, healthcare, and emergency response. Efficient scream detection can save lives by alerting authorities to emergencies, enhancing video surveillance, and autonomously detecting violence. In healthcare, it helps monitor patients in distress when immediate human intervention isn't feasible. This dataset is essential for advancing safety technologies and providing timely assistance in critical situations.



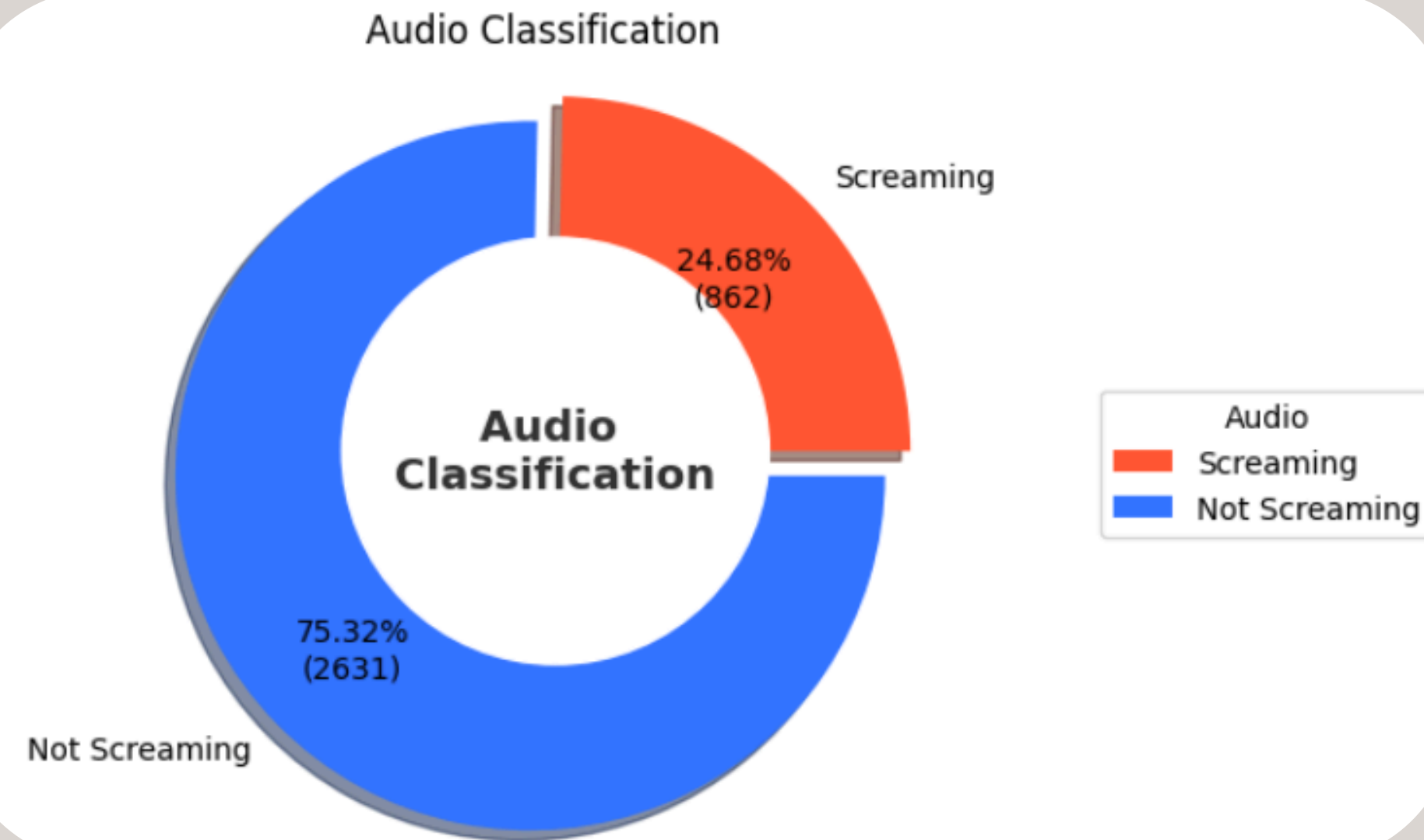
Dataset

- Two folders : “Screaming” and “Not Screaming”
- Audio WAV files
- “Not Screaming Files” : Music, Speech, Human voices, Environmental sounds
- Binary Classification Problem
 - class 0 : Not Screaming
 - class 1 : Screaming



Samples of New York City

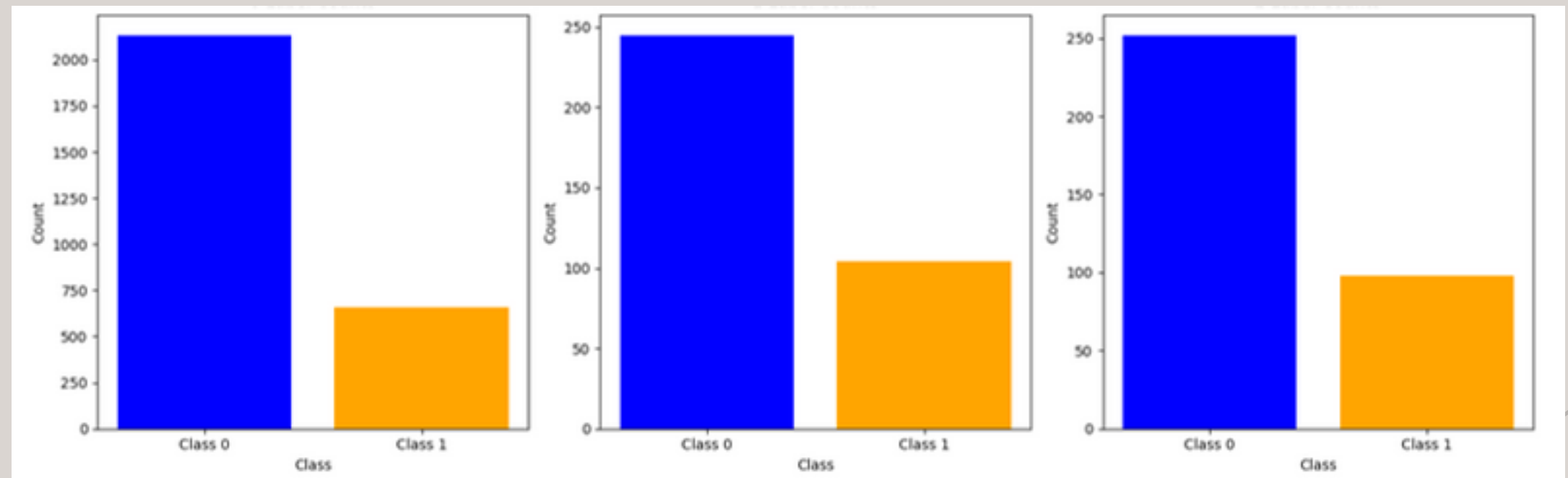
EDA



- Imbalanced Dataset
- Feature Extraction of 17 features
- **92%** of audio samples are **9-10** seconds long
- **Higher Energy** in screaming samples

Load and Preprocess

- Zero padding to 10 seconds
- Extraction 128 mel Spectograms
- Time steps 1001
- Spitting 80% training, 10% validation and 10% test



Data Augmentation

Noise

- Categories of Noise :
Traffic Sounds, Rains sounds, Birds sounds, Crowd sounds
- Level: 40% noise
- Classes: Both

Time Shift

- Time shift : 2 seconds
- Classes : 50% in class 1



Class Weights

- Balanced classes

Models



Models	Baseline	Data Augmentation	Class Weights	Class Weights includes D.A .
SVM	✓			
FNN	✓	✓	✓	✓
CNN *	✓	✓	✓	✓
CNN F1 score callbacks	✓	✓	✓	✓
ResNet	✓	✓	✓	✓

* Regularization

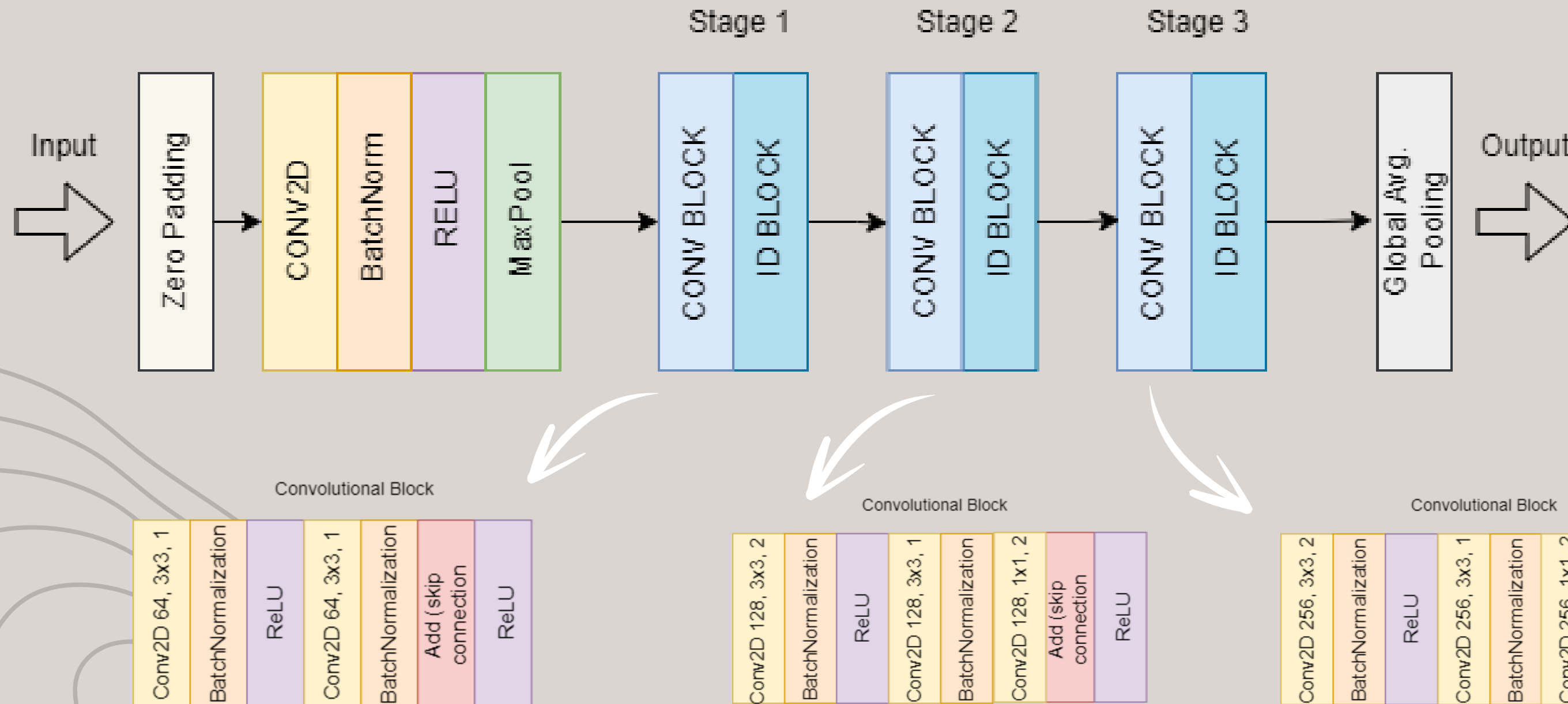


ResNet

Architecture:

Generate Better:

- F1 Score : Highest
- False Positives : Least



Deployment



New York City



London

Imagine our training dataset was sourced from New York City; our goal is now to ensure the model performs effectively in London. This adaptation is crucial for optimizing surveillance systems to meet London's specific needs and conditions. We aim to achieve robust performance in identifying scream events, enhancing public safety and security through reliable detection in urban settings like London.

Strategy of Deployment

- Load and Preprocess the same as New York's dataset.
- Balanced dataset
- **class 0** : negative
class 1 : positive

- Train Dataset: London's
- Validation: London's
- Test: London's

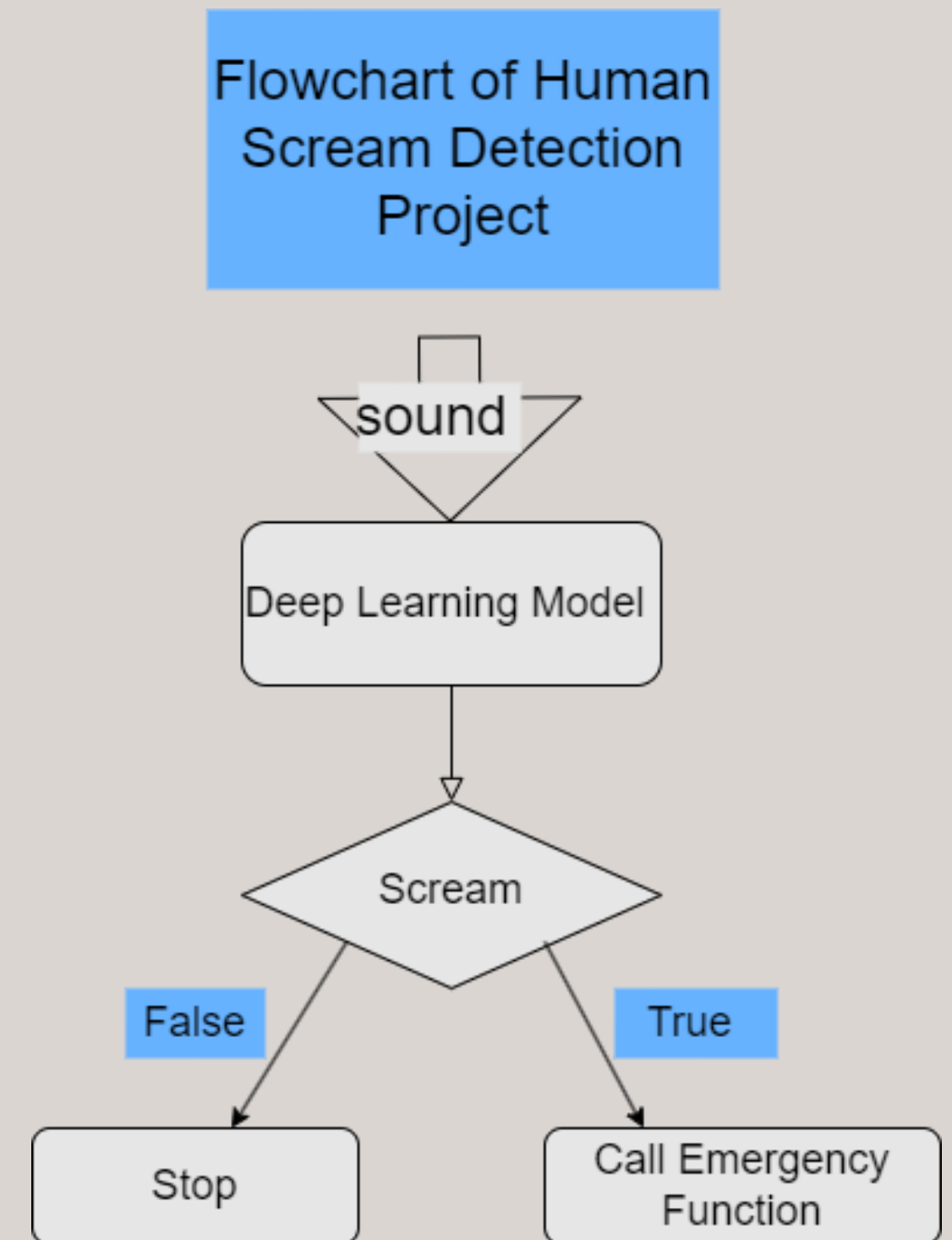
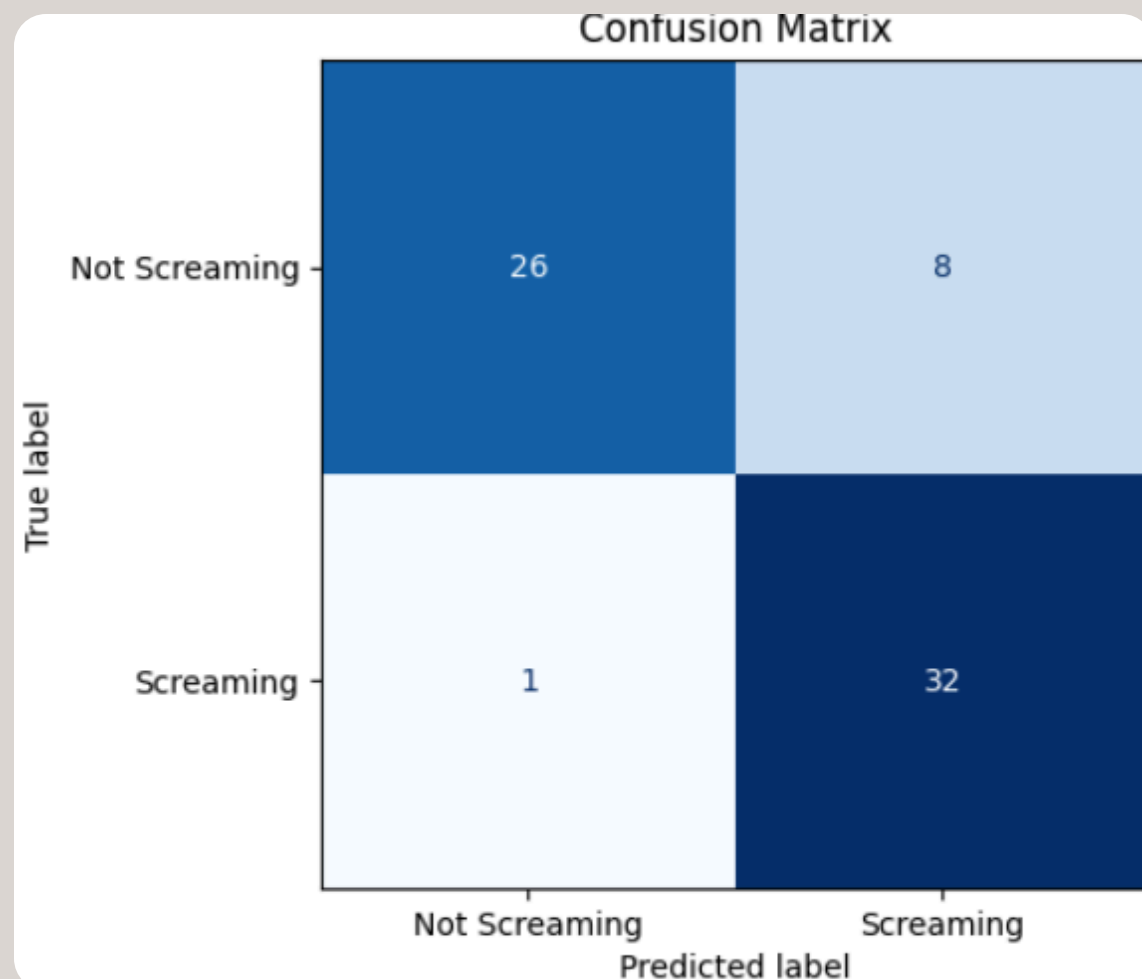
- Train Dataset : New York's
- Validation : New York's
- Test : London's

- Train Dataset : London's
- Validation : London's
- Test : New York's

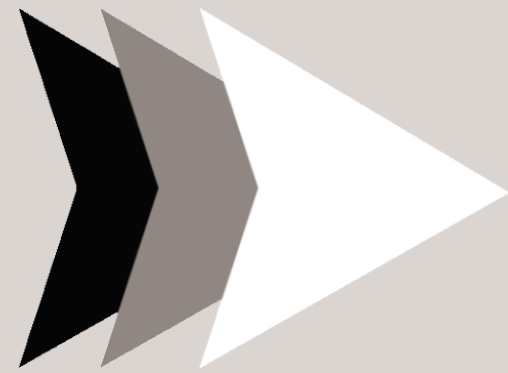
- Train : New York's + 30% London's
- Validation : London's
- Test : London's

Results of Strategy

	precision	recall	f1-score	support
0	1.00	0.85	0.92	34
1	0.87	1.00	0.93	34



Github



PreviewCodeBlame19 lines (13 loc) · 2.39 KBCode 55% faster with GitHub CopilotRawCopyDownloadEditMenu

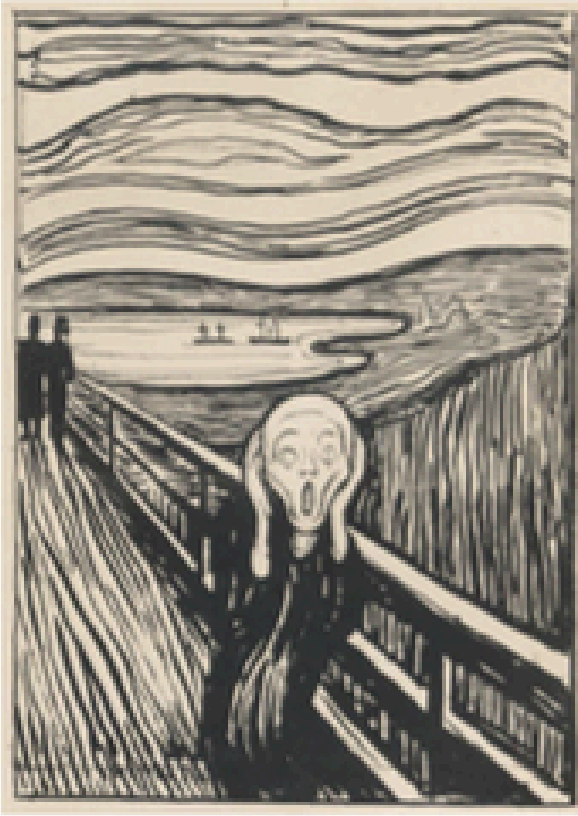
Human_Scream_Detection

The Human Screaming Detection Dataset is a specialized collection focusing solely on identifying and analyzing human screams. This dataset is invaluable for developing machine learning models in critical areas such as security, healthcare, and emergency response. In today's world, where timely intervention can save lives, the ability to detect screams efficiently is paramount. For instance, in security, rapid scream detection can alert authorities to potential assaults or emergencies, enabling faster response times. In addition to traditional video surveillance, various audio processing techniques can also be added to existing CCTV cameras. These enhancements serve as additional features to help analyze the scene better and autonomously detect violence or any unwanted activity. In healthcare, scream detection can be used to monitor patients in distress, particularly in scenarios where immediate human intervention might not be feasible. Overall, the dataset plays a crucial role in advancing technologies that enhance safety and provide timely assistance in urgent situations.

Dataset : The dataset utilized in this analysis was sourced from Kaggle. The link to access the dataset is provided: [Kaggle Dataset](#)

Noise Dataset : The noise dataset utilized in this project for data augmentation was obtained from a specialized sound engineer.

Deployment Dataset : The dataset utilized in this analysis was sourced from two different Kaggle datasets. The link to access the dataset is provided: [Kaggle Dataset 1](#) and [Kaggle Dataset 2](#)

The Scream by Edvard Munch, depicting a figure in the foreground with a pained expression, looking out over a turbulent, wavy sea under a dark, stormy sky.

Thank you

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