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Emergency Sirens Detection Using Deep Learning

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Introduction

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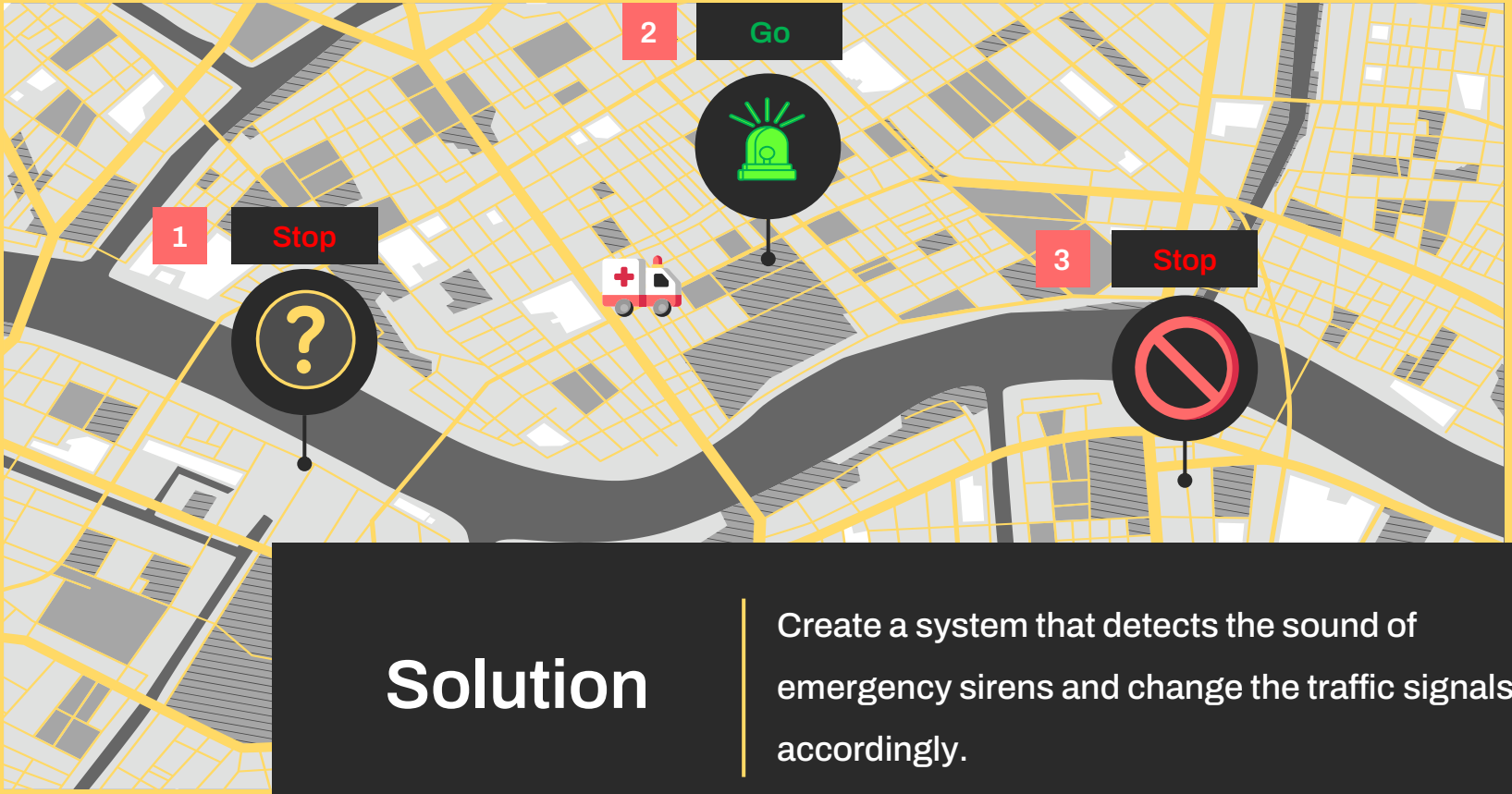
1 Introduction

- Due to heavy traffic, emergency vehicles are delayed in responding to an incident.
- This costs people their lives.



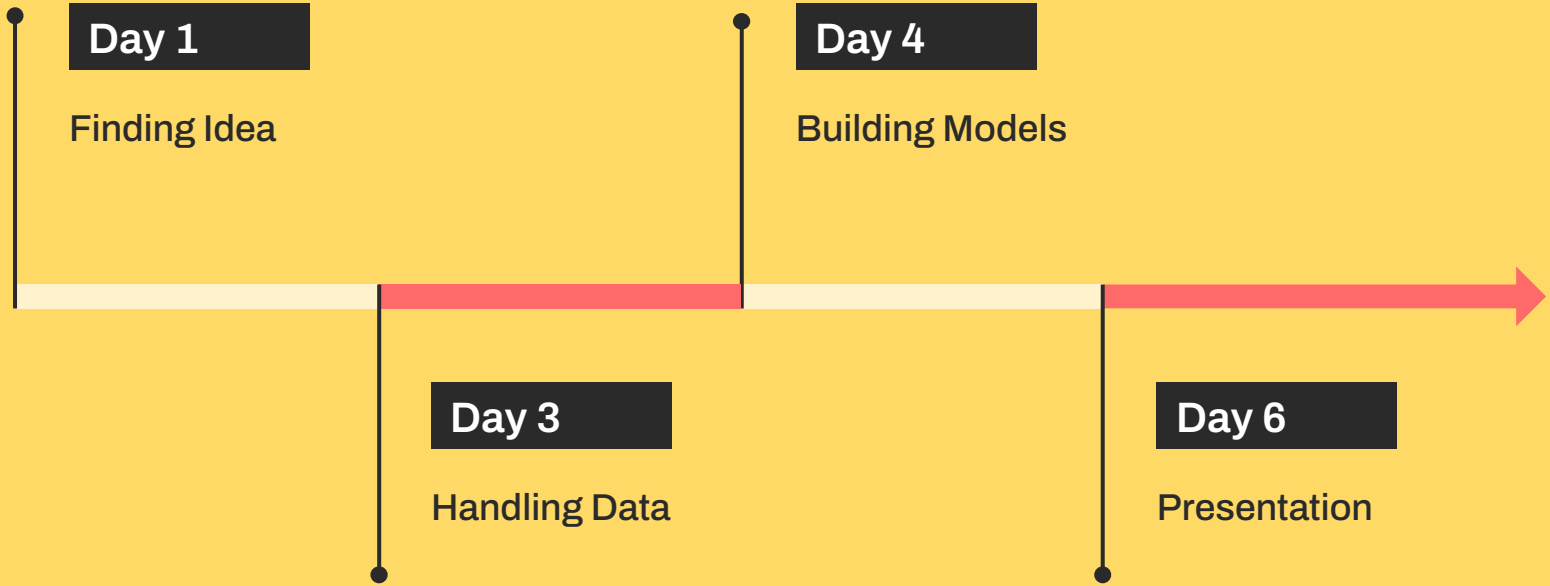
Solution

Create a system that detects the sound of emergency sirens and change the traffic signals accordingly.

Workflow

2

2 Workflow


Day 1
Finding Idea
Day 4
Building Models
Day 3
Handling Data
Day 6
Presentation

Data

3

3 Data

23m 32s

Emergency clip

27m 16s

Non-Emergency clip

3 Data

Non-Emergency Chunks

1627 chunks

Emergency Chunks

1373 chunks

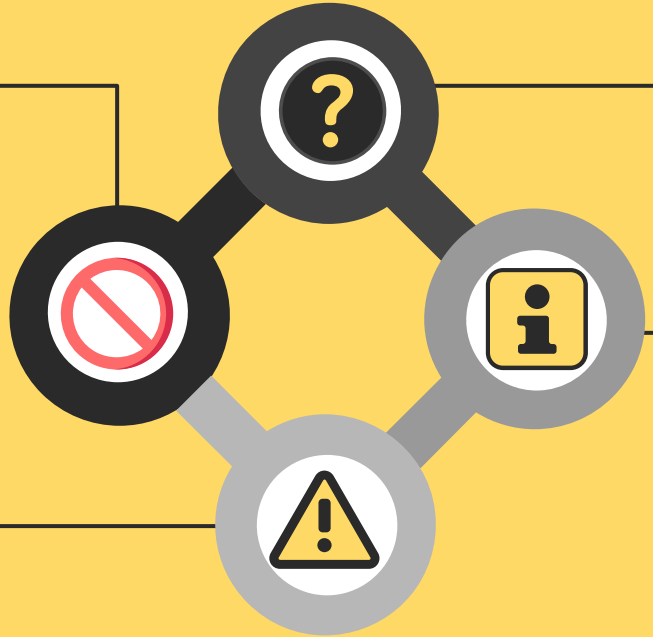
3 Data

Chunks 1

Split each clip into 3 sec per chunk

Concat 2

Concat emergency & non-emergency



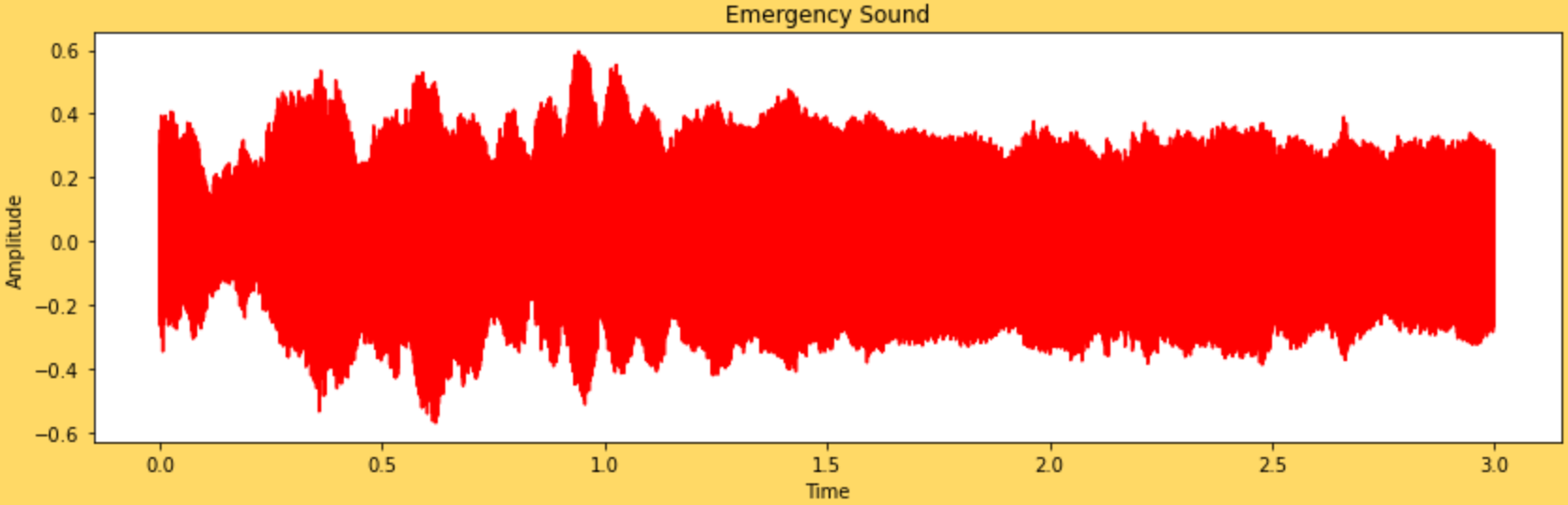
Assign Labels 3

0 -> Emergency
1-> Non-Emergency

Split Data 4

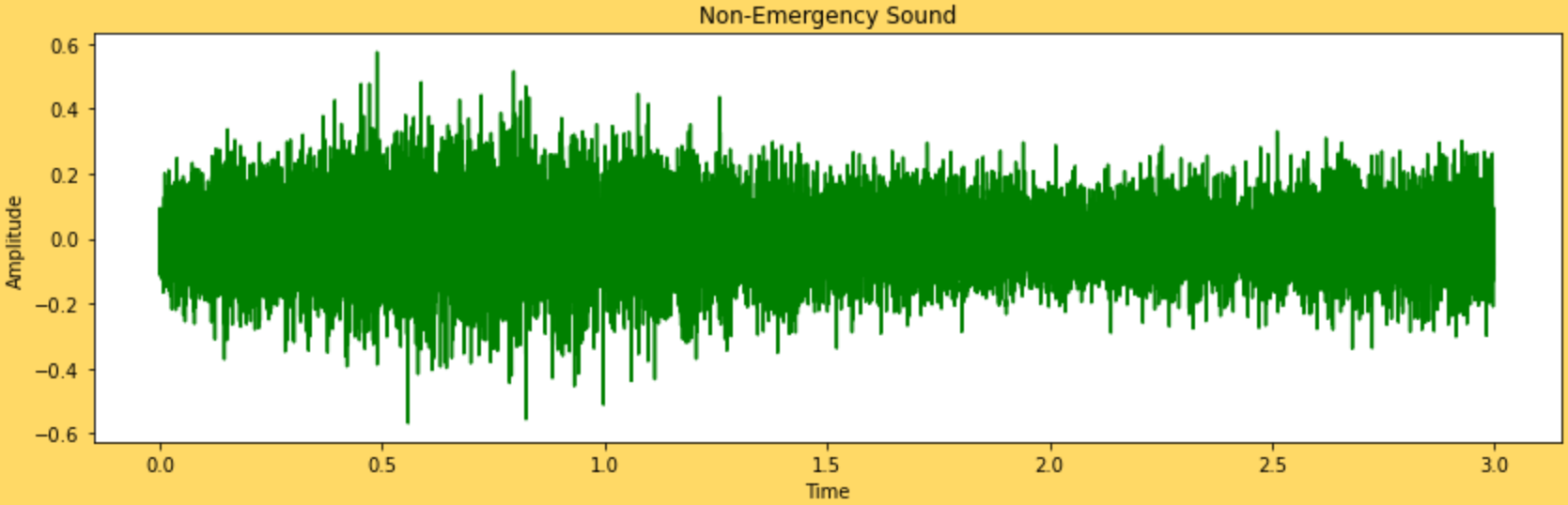
Train, Validation and Test

3 Data



Emergency Sound

3 Data



Non-Emergency Sound

Tools

4

4 Tools

Librosa

Audio pre-processing

Scipy

Audio features creation

IPython.display

Playing the audio

Matplotib

Visualizing the data

Sklearn

Splitting the data

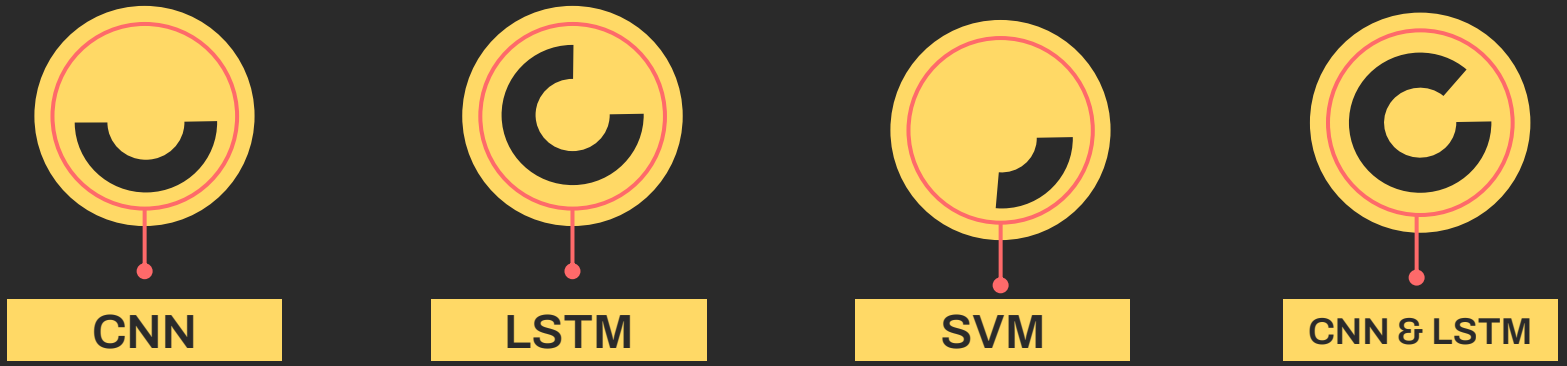
Keras

Implementing the neural nets

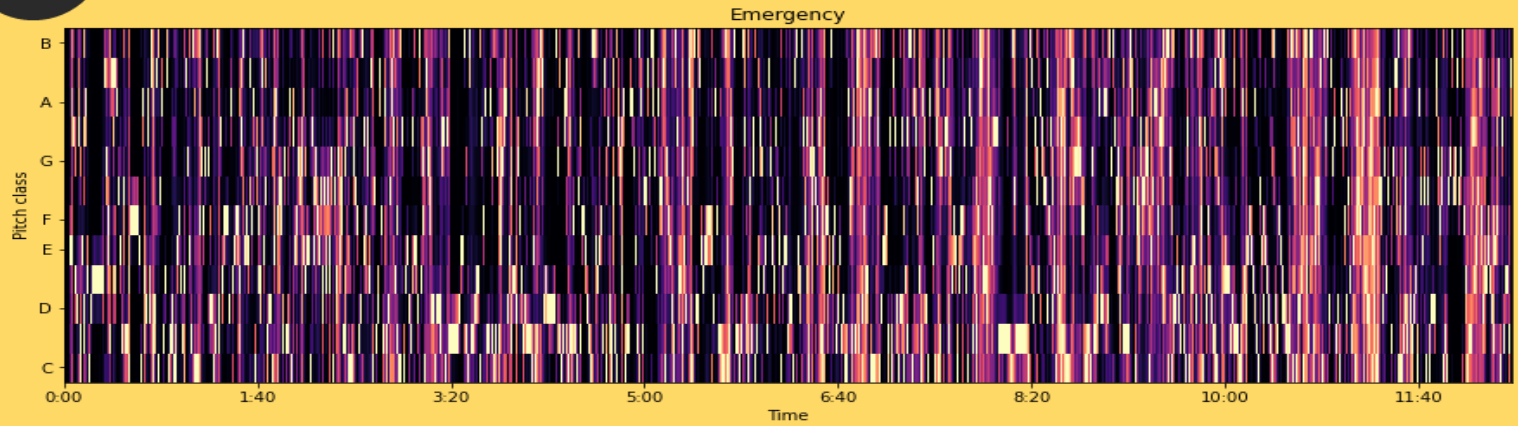
Models

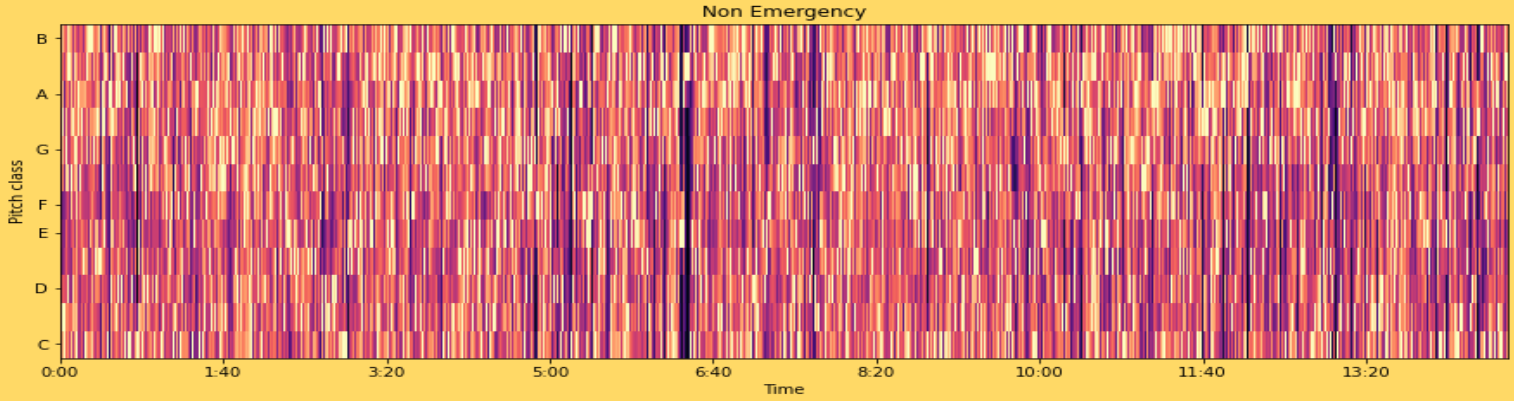
5

5 Models



5 Featuers extraction





5 Models

	CNN	CNN	SVM	SVM	LSTM	LSTM	CNN & Features	LSTM & Features
Traning	77.6%	80.42%	82.23%	99%	89.32%	84.74%	98.95%	92.24%
Test	75.0%	78.5%	67.33%	97%	80.5%	81.83%	97.5%	91.5%

Conclusion

6

6 Conclusion

People die each day due to a delay in getting medical assistance. Therefore,this project will help to save people lives.

Future work:

- Connect with SAHER and road cameras
- Connect with traffic signals
- Improve the system to identify the direction of emergency vehicle
- Deploy application that classify live audio

Thanks ☺