

Capstone Project Snore Detector

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Overview

- Context
- Problem Statement
- Methodology
- Future Work

Snoring affects everyone



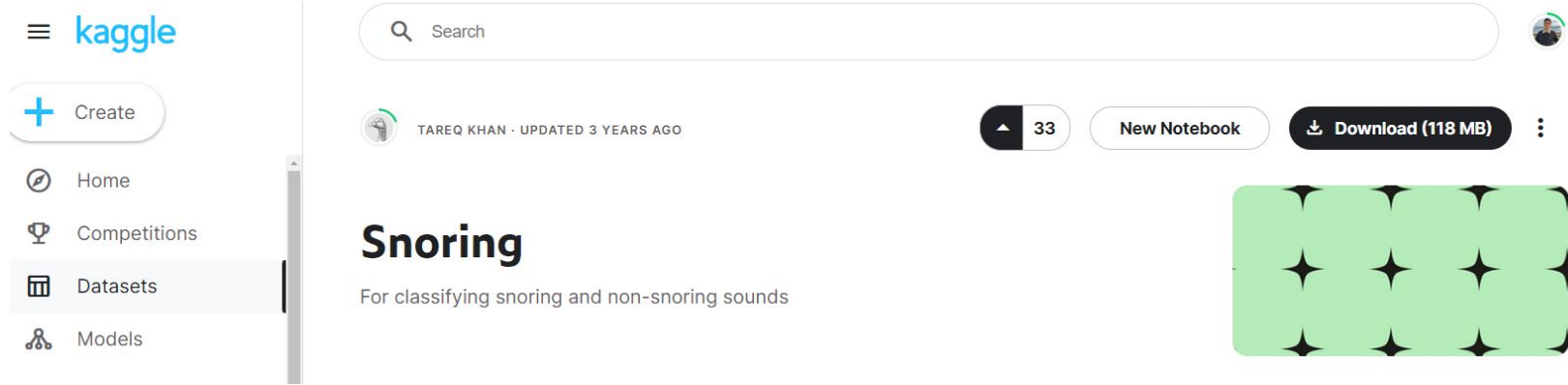
Problem Statement

- Build a classification model
 - Detect snoring
 - Provide details of snoring

Methodology

- Data Collection
- Extract features
- Train Classification Models
- Tuning
- Deploy best model

Methodology: Data Collection



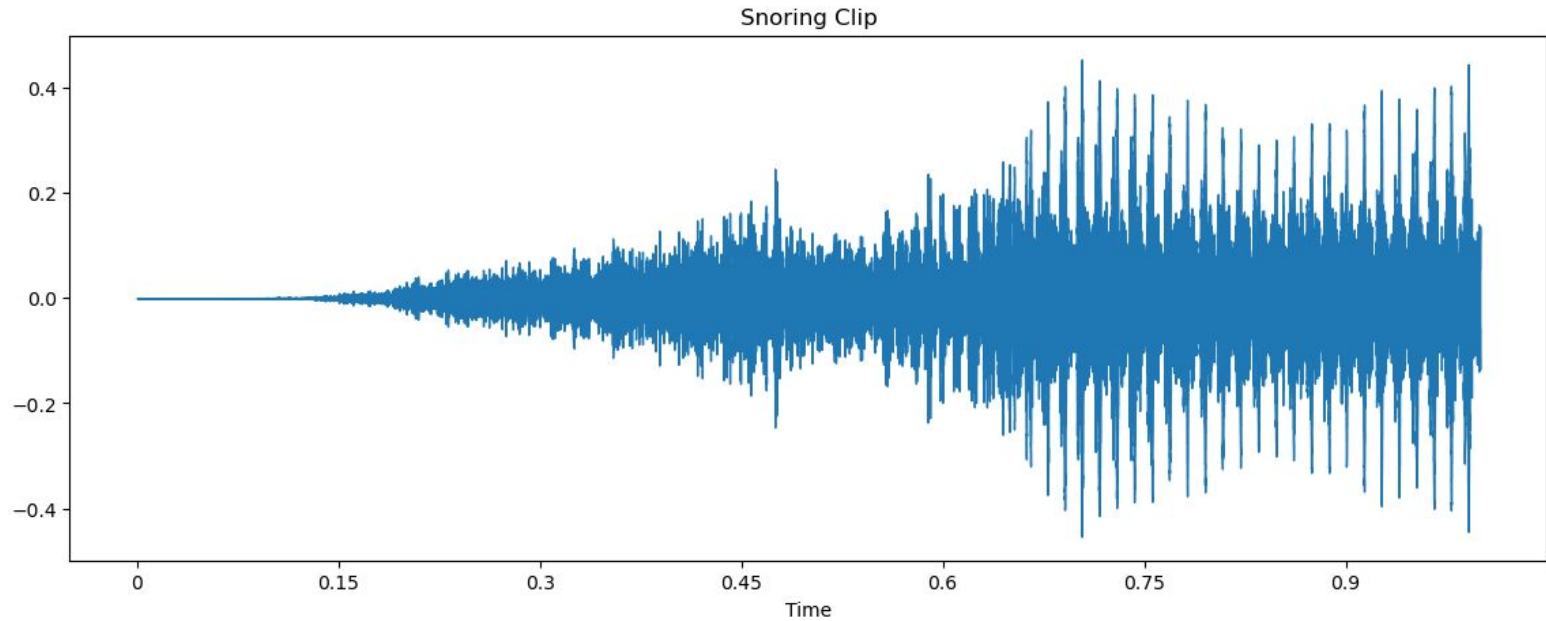
Credit to Dr Tareq Khan for providing the data

500 snoring clips

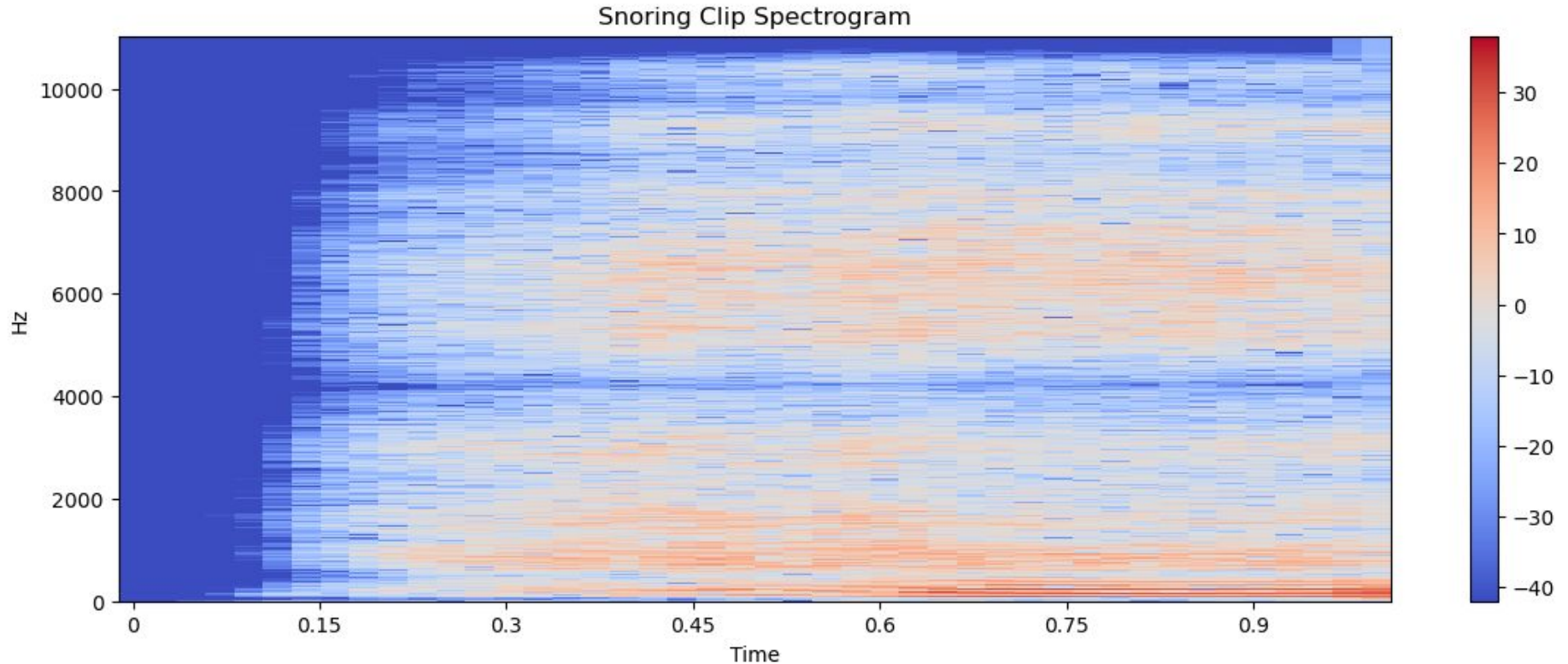
500 non-snoring clips

1 second each

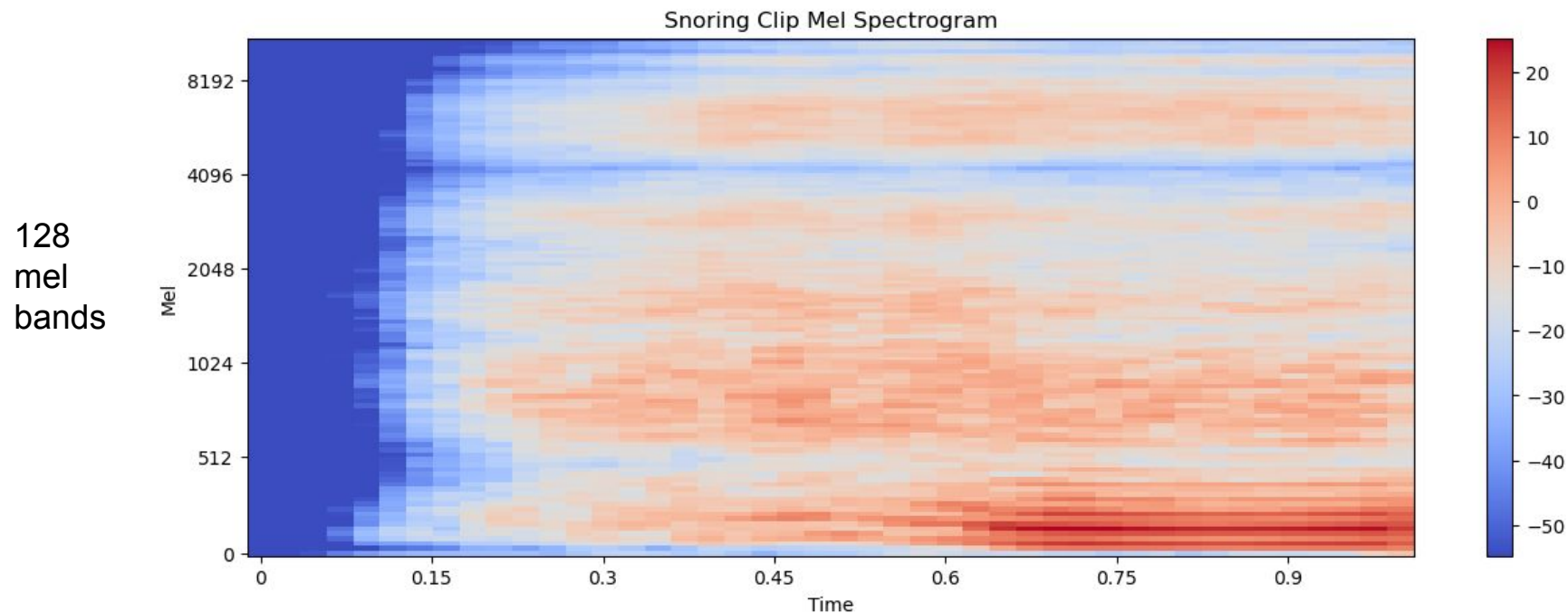
Methodology: Extracting Features



Methodology: Extracting Features

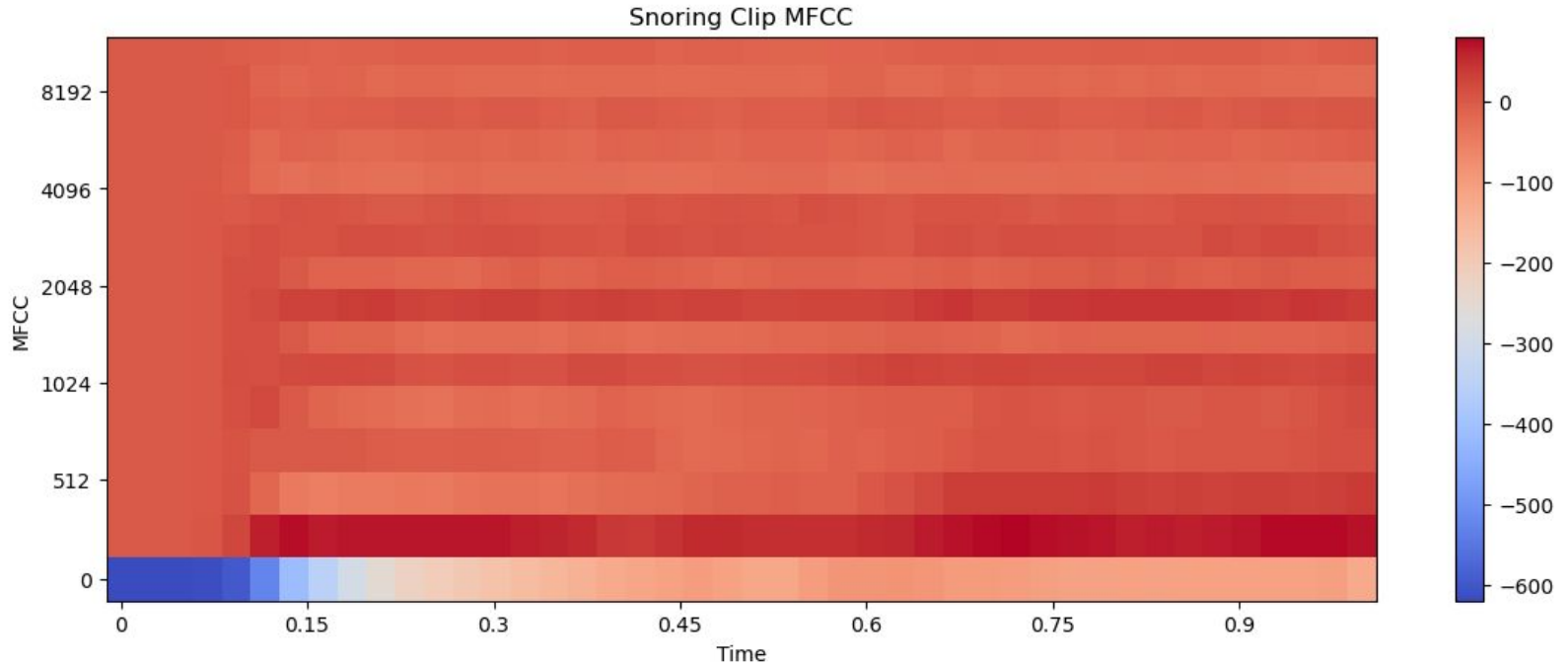


Methodology: Extracting Features

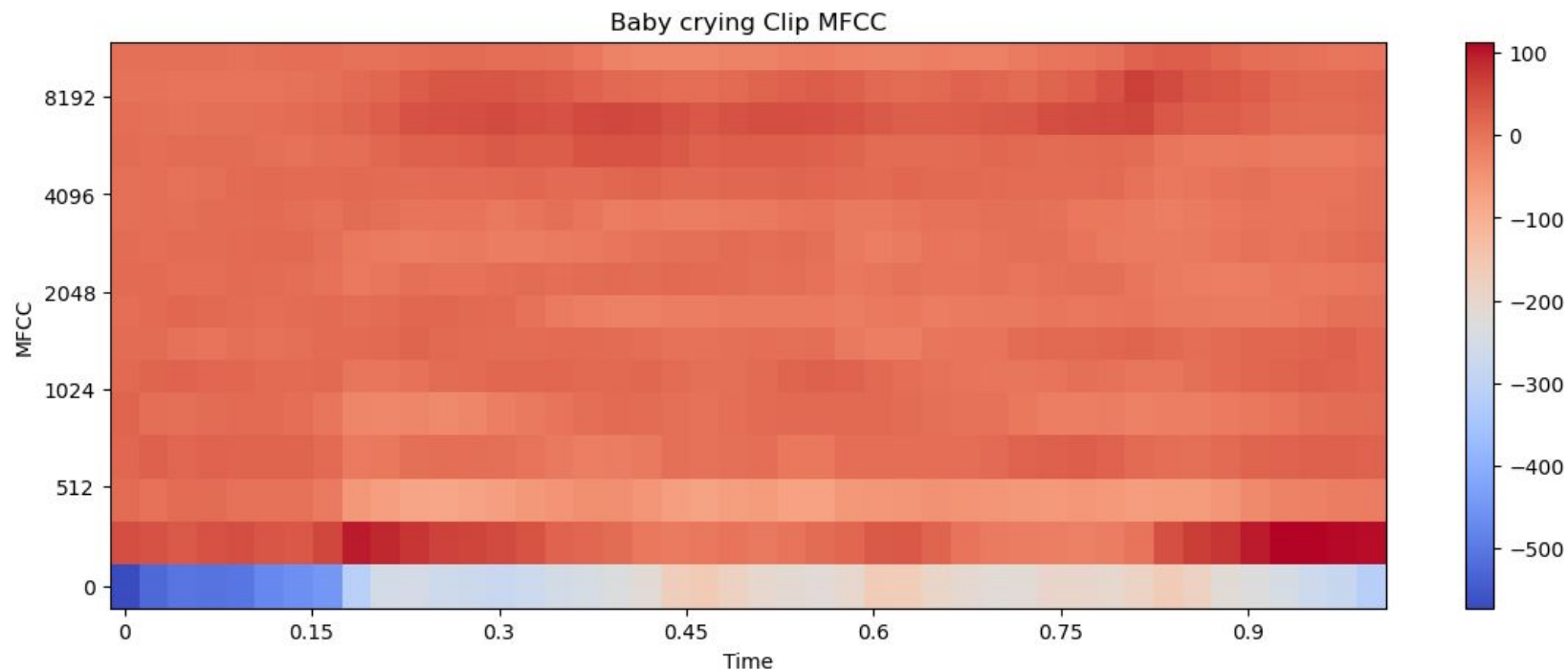


Methodology: Extracting Features

16
MFCC
bands



Methodology: Extracting Features



Methodology: Extracting Features

Why MFCCs (Mel Frequency Cepstral Coefficients)?

- Commonly used in speech recognition
- Compressed and small
- Reduces noise in data

Methodology: Train Classification Models

- How many MFCCs?
- Model: Logistic Regression

Number of MFCCs	16	32	64	128
Accuracy Score Train/Test 10 CVs	0.761/0.712	0.884/0.904	0.945/0.936	0.948/0.936

Methodology: Train Classification Models

- Which model?

Classifier	Logistic Regression	Naive Bayes	K-Nearest Neighbours	Random Forest	Support Vector Machine
Accuracy Score Train/Test 10 CVs	0.945/0.936	0.79/0.772	0.956/0.94	0.984/0.988	0.964/0.944

Methodology: Train Classification Models

- Which model?

Classifier	Logistic Regression	Naive Bayes	K-Nearest Neighbours	Random Forest	Support Vector Machine
Accuracy Score Train/Test 10 CVs	0.945/0.936	0.79/0.772	0.956/0.94	0.984/0.988	0.964/0.944

Methodology: Tuning

- Unseen Data: 9 periods of snoring


Probability Threshold	0.5	0.45	0.4
Accuracy	4/9	6/9	9/9

Methodology: Deploying Model

Streamlit:

<https://b-ongys-snore-detector-capstone-project-main-uhalq5.streamlit.app/>

Upload audio clip



Drag and drop file here
Limit 200MB per file • WAV

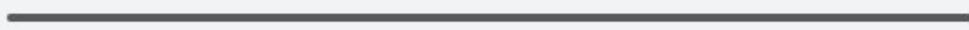
Browse files



1_4.wav 96.6KB



0:00 / 0:01



1 seconds of snoring was detected

Future Work

- Module of a sleep apnea detection product
 - Calculate periodicity of snoring
 - Detect absence of breathing
- Deep Learning model
- Explain MFCCs