

# Project 3 Proposal

## Predicting Respiratory Sounds

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### Background

Cough and cold season is upon us, which makes this project timely. The respiratory sounds a person makes indicate their respiratory health and disorders. Doctors diagnose patients through the use of stethoscopes, which can also be recorded using digital stethoscopes. The respiratory sound is related to the movement of air within the lungs, along with changes in lung tissue and secretions. The sounds of crackles and wheezes can indicate disorders, such as asthma or pneumonia.

### MVP

Build a model to detect if a recording contains crackles, wheezes or both. A later version will diagnose the patient as either healthy or having asthma, bronchiectasis, bronchiolitis, COPD, LRTI, pneumonia, or URTI.

### Data

Data for this project will come from the [Respiratory Sound Database](#) from Kaggle. It includes 920 annotated recordings, with lengths that vary from 10-90 seconds. The patients span all age groups - children, adults and the elderly.

The Kaggle dataset includes:

- 920 .wav sound files
- 920 annotation .txt files
- A .csv file listing the diagnosis for each patient
- A .txt file explaining the file naming format
- A .txt file listing 91 names (filename\_differences.txt )
- A .txt file containing demographic information for each patient

Feature	Data Type	Additional Description
Beginning_of_respiratory cycle	Float	
End_of_respiratory_cycle	Float	
Presence_absence_of crackles	Integer	0 or 1 – Classification target for mvp
Presence_absence_of_wheezes	Integer	0 or 1 – Classification target for mvp
Diagnosis	String	This will be the target after the mvp
Patient_id	Integer	
Time	Float	From audio spectrogram

Frequency	Float	From audio spectrogram
Age	Integer	
Sex	String	
Adult_BMI	Float	
Child_weight	Float	
Child_height	Float	

#### Known challenges

- Sound clips vary in length
- The data includes both clean respiratory sounds as well as noisy recordings that simulate real life conditions.