Zaprojektuj proces zbudowania aplikacji służącej do rozpoznawania skończonej liczby różnych gatunków ptaków na podstawie danych dźwiękowych.

Firstly, I consentrated on searching for available databases of bird audio samples

xeno-canto.org provides a wide open source database of audio samples in the mp3 format. Fortunately, in the legal notice they don't prohibit downloading and personal use of the dataset.

Secondly, I made a simple scrapper that collected information of the records. The most important features for me were

- name
- path to the source file
- class (quality of recording)
- type

Unfortunately, the scrapping was a time-consuming process. I collected about only 30000 records during 4 hours. The collected information was saved in a json file here.

Then the gathered inforation I transformed to a pandas DataFrame here and filtered only the records of *A* class. Than there were selected two most frequent kind of birds and their audio samples were downloaded and saved locally.

1) Zaproponuj formę danych i sposób budowy bazy danych przeznaczonych do procesu nauczania.

Despite I stored information locally: record info as a json file and audio files in a directory. I would suggest to store the data in MongoDB. In the dataset I collected there were only few files with size greater than 16 Mb. Very simplified example is here. Therefore extensive use of GridFS is not required.

2) Jak określisz wielkość bazy danych niezbędną do przeprowadzenia procesu nauczania?

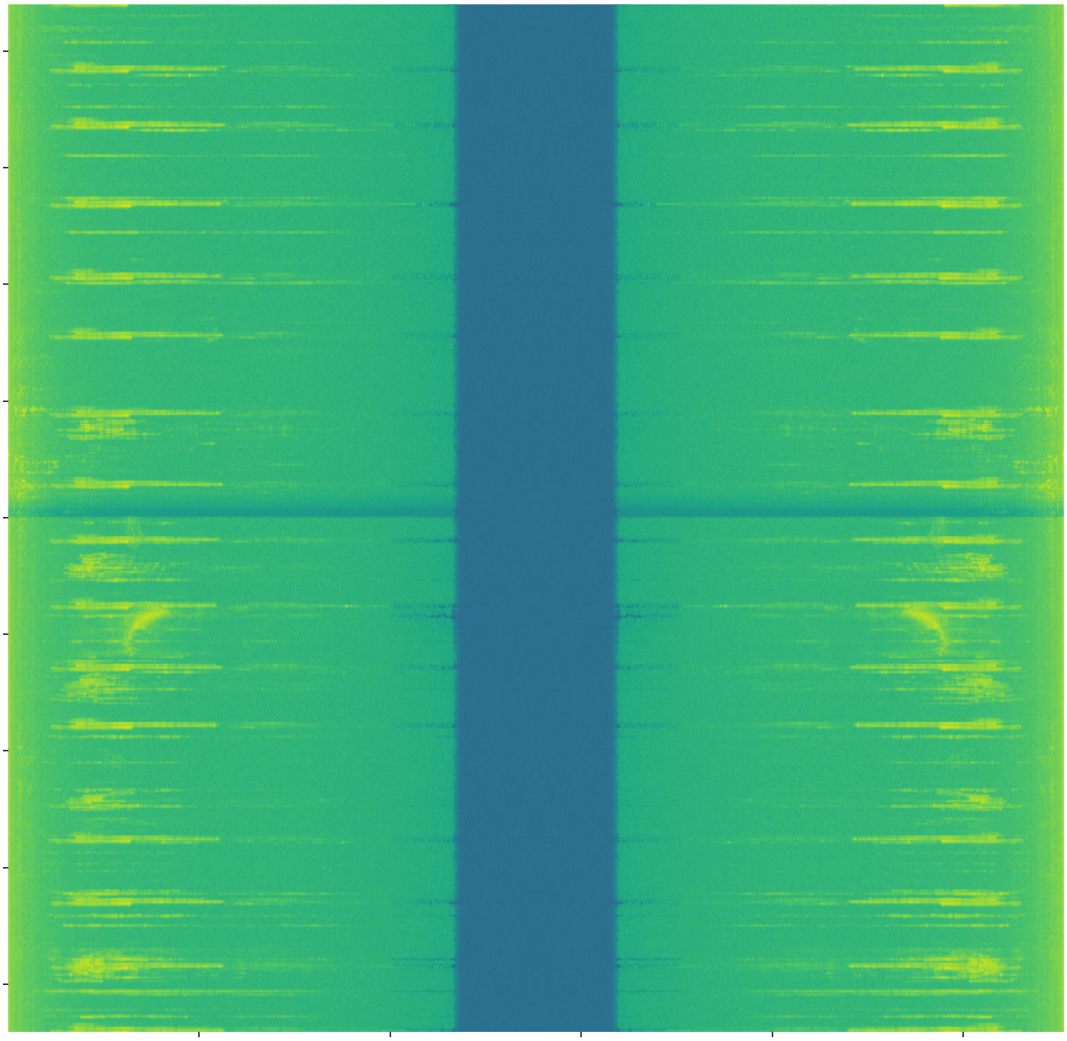
As I collected information, I noticed the numbers of records available to a particular bird kind are not balanced. Therefore, methinks, it is reasonable to use only the kinds those have sufficient number of audia samples. In this case the sufficient number will depend on the future model used for classification.

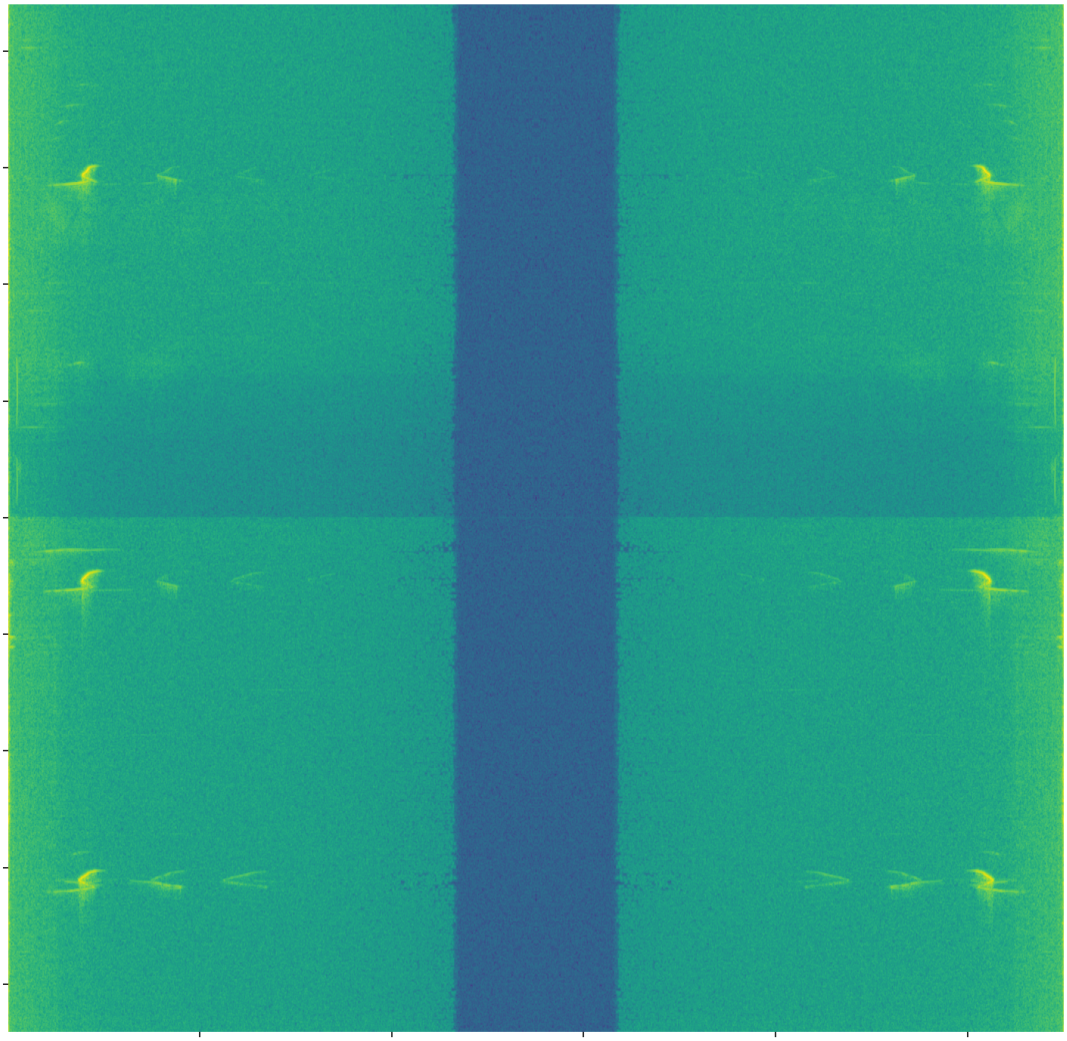
3) Jaki algorytm/algorytmy nauczania zastosujesz? Na jakiej podstawie go wybierzesz?

To be frank, the tolpic is new for me. Thus I googled the following articles audio-deep-learning-made-simple-sound-classification

Introduction to Audio Classification

They suggest to transform the audio files to spectrograms and then apply CNN. However, in my particular case the audio samples mostly short repeating fragments.





Therefore the spectrograms a required high resolution that would make expand the neural network extensively. I realized I would not able to launch the model quickly. Therefore I was looking for a tool for extracting these repeating sequances. And I found the following article:

Audio Analysis

This approach offers a feature extractions those are used for audio classification.

4) W jaki sposób zwalidujesz uczony model?

5) Jakie parametry wykorzystane w procesie nauczania będziesz zmieniać w celu optymalizacji działania modelu?

6) Jakie przedstawisz wymagania dla urządzenia, na którym zbudowana aplikacja będzie uruchomiona? Jakie parametry/podzespoły są istotne w analizowanym przypadku?

7) W jaki sposób może objawić się zjawisko przetrenowania modelu? Jaki wpływ będzie miało przetrenowanie na działanie gotowej aplikacji?