Audio-based identification of beehive states dataset

Dataset documentation

May 5, 2019

1 Description

This dataset was created as part of our work in Audio-based identification of beehive states, [1]. In this project, we address the idea of automatic recognition of different states that a beehive goes trough.

The data made available here is a selection of recordings acquired through the NU-Hive project [2], which its main goal is to develop a beehive monitoring system capable of identifying and predict certain events and states of the hive that are of interest to the beekeeper. The NU-Hive project is a comprehensive effort of data acquisition, concerning not only sound, but a vast amount of variables that will further allow the study of bee behaviour and gets us closer to the ideal of precision beekeeping.

The selected recordings are from 2 hives and capture these in two different states: a Queen less hive, where for some reason the queen bee is missing and normal/active hive, where nothing abnormal seems to be happening with the hive. For each state a whole day of recordings is available for each hive.

All recordings have duration of approx.10 min. In summary we have 576 audio-files, half of which are labelled as missing queen and the other are labelled as normal/active beehive, they represent 2 hives in 2 days each.

2 File structure and use

the dataset consists in list of audio files organised by hive and day of recording: (e.g Hive1_date.rar). The labels for each individual recording file can be read either from the file's name or from the state_labels.csv file that lists all the recordings and corresponding labels.

Below is a sample of state_labels.csv file:

```
Hive3_14_07_2017_NO_QueenBee___23_40_00,missing queen
Hive3_14_07_2017_NO_QueenBee___23_50_00,missing queen
Hive3_28_07_2017_QueenBee___00_00_00,active
Hive3_28_07_2017_QueenBee___00_10_00,active
Hive3_28_07_2017_QueenBee___00_20_00,active
Hive3_28_07_2017_QueenBee___00_30_00,active
```

Additional recordings (without the same explicit label for beehive state) have been made available **here**, and may be a good complement to this data.

Auxiliary python code to read the data can be found **here**.

References

[1] I. Nolasco, A. Terenzi, S. Cecchi, S. Orcioni, H. L. Bear, and E. Benetos, "Audio-based identification of beehive states," in *ICASSP 2019-2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE, 2019, pp. 8256–8260.

[2] S. Cecchi, A. Terenzi, S. Orcioni, P. Riolo, S. Ruschioni, and N. Isidoro, "A preliminary study of sounds emitted by honey bees in a beehive," in *Audio Engineering Society Convention 144*, 2018.