The SPG (Signal Processing Group) Sound Database

Lucian TODOR, Vlad ZOICAȘ, Lăcrimioara GRAMA, Corneliu RUSU

Abstract

In this brief we present the audio recordings of heavy cars and chainsaws available in the SPG (Signal Processing Group) Sound Database. These audio signals have been used to detect intruders in wildlife protected areas. The sounds have been recorded outside, thus they are subject of some additive noise from surrounding area.

1 Introduction

There are many natural reserves with wildlife, flora, fauna or features of geological or other special interest which are spread and there is practically impossible a continuous surveillance of all these areas [2]. To address this problem, previous works have been focused on performances of a potential monitoring system that could be assimilated to an acoustic eye. The sounds of interest are related to several different events that must be monitored inside of such protected areas. For the purpose of this work we are interested in the detection and classification of few sound classes: sounds originated from humans, birds, cars and animals. Since sounds originated from humans, birds, and animals are available on public databases, we have been focused on finding sound originated from cars and other engines which can be related to intruders in wild areas.

A first set of audio recordings has been provided in [2]. The sounds form a database of over 100 recordings. Database was recorded by the authors and contains recordings of vehicle sounds, mostly sedan cars. These recordings are rather short, 2 to 4 s each. This is quite close to real situations, when for example a car passes through a check point where an acoustic sensor is placed and the useful recorded sound will not exceed 2 to 3 s. These files form the first part of the SPG (Signal Processing Group) Sound Database for wildlife intruder detection.

In this brief we present other types of audio recordings. We are focusing on heavy cars and chainsaws which are closed related to intruders in wildlife protected areas. This part of the SPG database has been used in [3], and the results to detect intruders using the sparsogram implementation are quite promising. The signals were recorded with the digital voice recorder Olympus WS-750M. Note that the recordings have been achieved outside and they are not studio recordings. This means that they are subject of some additive noise from surrounding area. The stored audio files represent Pulse Code Modulation (PCM) wave files (*.wav).

2 The Chainsaws Section of the SPG Sound Database

The chainsaws database contains sounds recorded stereo with a sampling rate of 44.1 kHz (32 bit - float), originate from 10 types of chainsaws.

The type of the chainsaw along with the length of the audio file is presented in Table 1.

No.	Type of chainsaw	Recording duration [s]
1	Husqvarna 262	65.30
2	Husqvarna 365	70.86
3	Husqvarna 372	57.96
4	Husqvarna 450 E	32.60
5	Husqvarna 51	39.56
6	Makita DCS 4301	49.72
7	Ruris 340	59.84
8	STIHL MS 210	70.91
9	STIHL MS 230 C	40.77
10	STIHL MS 181	51.31

Table 1: The Chainsaws section of the SPG sound database

In Fig. 1 the time-domain characteristics of the audio files (left channel) are illustrated for all 10 types of chainsaws.

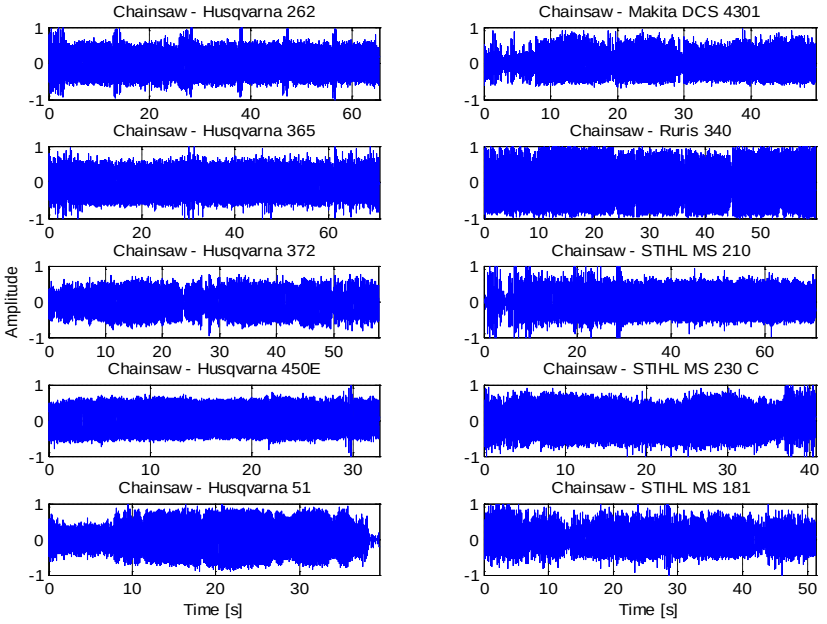

Figure 1: Time domain representation of chainsaws audio signals

3 The Heavy Cars Section of the SPG Sound Database

The heavy cars database contains sounds recorded stereo with a sampling frequency of 44.1 kHz (32 bit - float), originate from 12 types of tractors (except for the unknown type of tractor which is recorded mono with a sampling rate of 22.05 kHz). The name of the heavy cars along with the length of the corresponding audio file is presented in Table 2. In Fig. 2 the time-domain characteristics of the audio files (left channel) are illustrated for 10 types of heavy cars.

No.	Type of heavy car	Recording duration [s]
1	Unknown tractor model	3.11
2	Hebei	50.38
3	Claas	46.43
4	John Deer	49.92
5	Komatsu	40.91
6	Manitou	34.41
7	UTB U650	40.40
8	UTB U650	50.85
9	UTB U302 DTCE	63.76
10	UTB U640 DTC	50.07
11	IFRON 240D	47.92
12	IFRON 240D	47.50
13	TAF 657	56.83
14	TAF N140	30.21

Table 2: The Heavy cars section of the SPG sound database

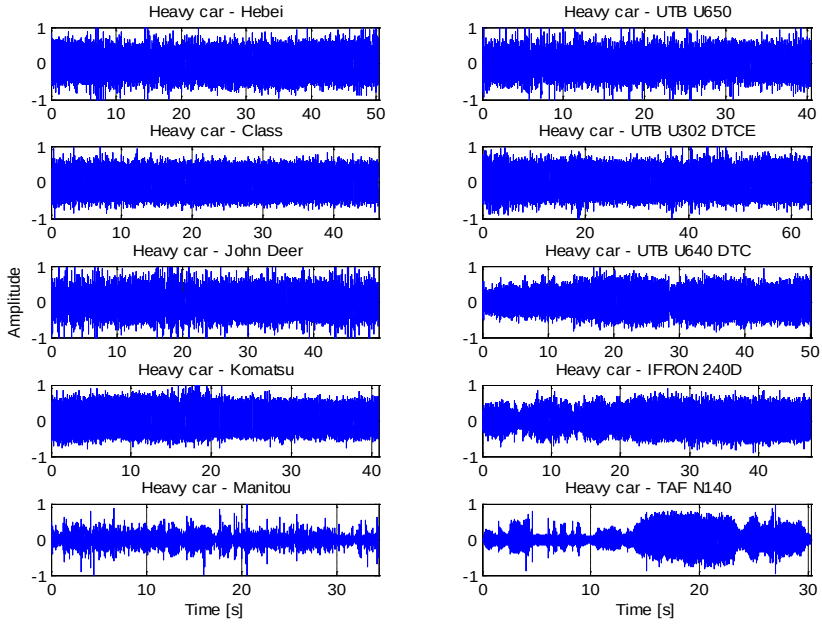

Figure 2: Time domain representation of heavy cars audio signals

4 Conclusions

In this brief we have presented a second part of the SPG database for wildlife intruder detection. We have discussed the heavy cars and the chainsaws section. The sounds from these sections of the SPG Sound Database have been used in [3] to detect intruders using the sparsogram implementation. They will be used in future works on wildlife intruder detection.

References

[1] The SPG (signal Processing Group) Sound Database, available on *http://sp.utcluj.ro/Sound_Database/Sound_Database.html*, 2014

[2] Ghiurcău, M. V., Rusu, C., Bîlcu, R. C., Astola, J., "Audio based solutions for detecting intruders in wild areas," *Signal Processing*, vol. 92, 2012, pp. 829-840.

[3] Roșu, R. G., Rusu, C., "A Sparsogram Implementation for Wildlife Intruder," *Proceedings of ISSCS2013*, Iași, Romania, July 2013.

Biography

Lucian Todor graduated Communications at Technical University of Cluj-Napoca and now he is a Master student in Integrated Circuits and Systems at the same University. He is interested in design and maintenance of electronic and communications.

Lucian TODOR
Technical University of Cluj-Napoca
Faculty of Electronics, Telecommunications and Information Technology
Bariţiu 26-28, Cluj-Napoca, RO-400027
E-mail: todor_lucian@yahoo.com