DCASE2021 CHALLENGE

Summary & Results, Task 4

T4 Sound Event Detection and Separation in Domestic Environments

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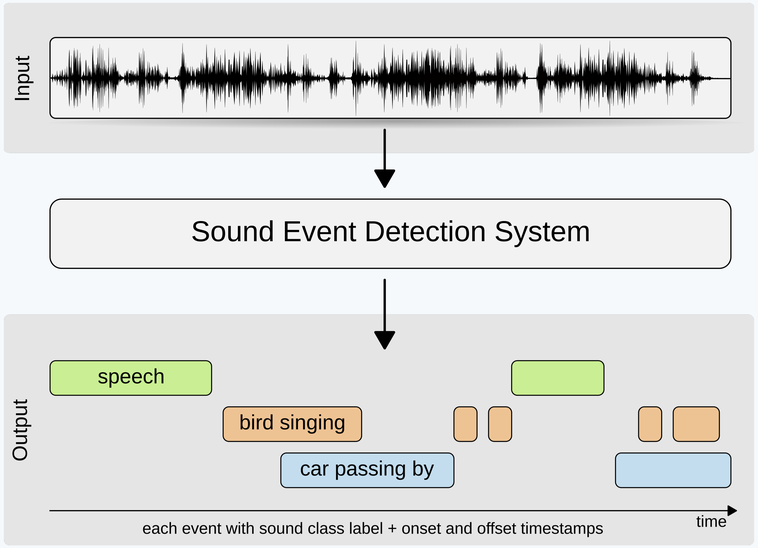
Results
https://tinyurl.com/DCASE2021-T4

Task description



- **Detecting and classifying sound events within 10-second audio clips from youtube and vimeo**
- *Motivation*: Smart home applications, assisted living
- *Challenges*: Partly and weakly labeled real training data + synthetic soundscapes (strongly labeled)

DESED Dataset

Novelties since 2020:

- **Non-target events:**
  - Clips from FUSS containing the non-target classes
  - Selection based on FSD50K annotations
- **Event distribution:** computed on annotations obtained by humans for ≈90k clips from Audioset.
- **Additionnal datasets:**
  - Sound events: FSD50K (both target and non-target)
  - Sound sources: YFCC100M (annotations not necessarily consistent with DESED)

Submissions

- 78 Systems
  - 22 Teams
  - 98 Authors

Ranking metric

Polyphonic sound detection score for two different scenarios

- **Scenario 1:** localization of the sound event is really important ($\mathrm{PSDS\_1}$)
- **Scenario 2:** relaxed localization constraint but strong constraint on class confusion ($\mathrm{PSDS\_2}$)

Ranking score:

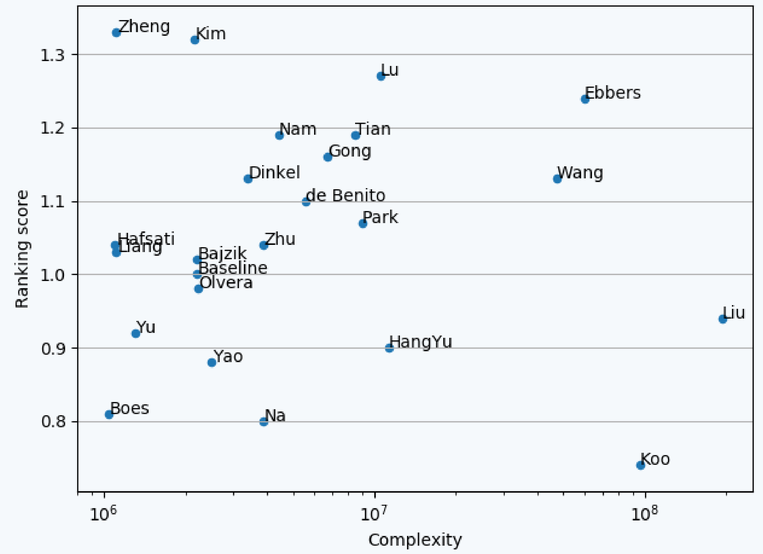
$$\mathrm{PSDS\_1} + \mathrm{PSDS\_2}$$

with $\overline{\mathrm{PSDS\_1,2}}$: the PSDS on scenario 1 and 2 normalized by the baseline PSDS.

Results and systems description, Top 10

	System Id		Scores		
Submission	PSDS1	PSDS2	Ranking	PSDS1	PSDS2
Zheng_USTC	SED_1	SED_3	1.4	0.452	0.746
Kim_AiTeR_GIST	SED_4	SED_4	1.32	0.442	0.674
Nam_KAIST	SED_2	SED_4	1.29	0.399	0.715
lu_kwai_task4	SED_1	SED_3	1.29	0.419	0.686
Ebbers_UPB_task4	SED_3	SED_4	1.24	0.416	0.637
Tian_ICT-TOSHIBA	SED_1	SED_1	1.19	0.413	0.586
Gong_TAL	SED_3	SED_3	1.16	0.37	0.626
Cai_SMALLRICE	SED_2	SED_3	1.14	0.373	0.596
Wang_NSYSU	SED_3	SED_4	1.14	0.339	0.662
Baseline_SSep_SED			1.11	0.364	0.58
deBenito_AUDIAS	SED_2	SED_4	1.1	0.363	0.577
Park_JHU	SED_2	SED_2	1.07	0.327	0.603
Liang_SHNU	SED_2	Ssep_SED_1	1.05	0.325	0.588
Hafsati_TUITO	SED_2	SED_2	1.04	0.336	0.55
Zhu_AIAL-XJU	SED_1	SED_1	1.04	0.318	0.583
Bajzik_UNIZA	SED_2	SED_2	1.02	0.33	0.544
Baseline_SED			1	0.315	0.547

Complexity



Take-away message

- Most of the systems used:
  - C(R)NN
  - Log-mel energies
  - Data augmentation
  - Teacher teacher-student
  - Median filtering
- Self-training is used by a few submissions
- Top performing systems are using ensembles
  - Best performing single system is ranked 11^{th}
- A few systems were specialized to scenarion 1/2
- **Complexity**:
  - Many systems are more complex than the baseline
  - The top performing system is simpler than the baseline
  - Overall complexity did not increase since last year

DETECTION AND CLASSIFICATION OF ACOUSTIC SCENES AND EVENTS