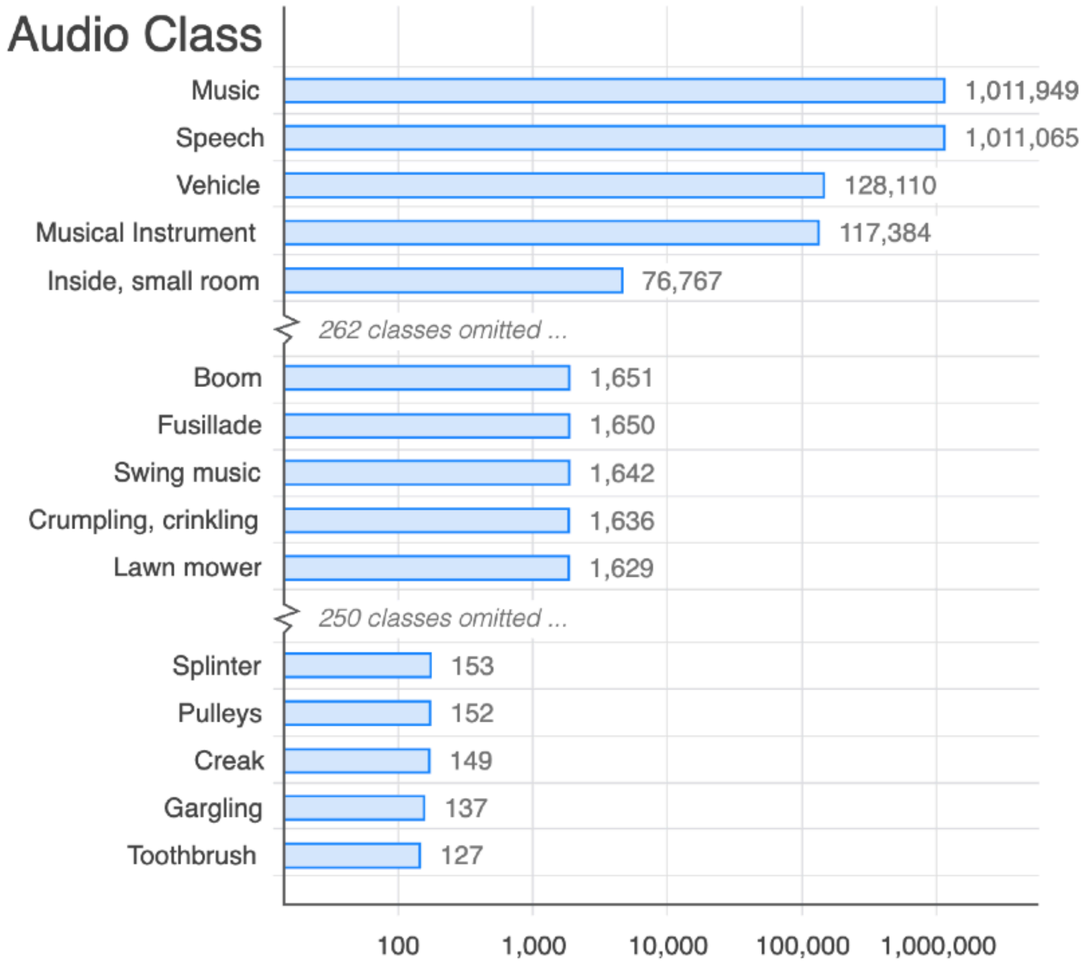
Speech Enhancement

With weakly labelled data

- Previous approaches:
  - Need noisy-clean paired data.
  - $f(s + n) \mapsto s$
- Proposed approaches:
  - Utilize AudioSet data for enhancement.
  - $f(s_1 + s_2 \,|\, c) \mapsto s_1$
- Audioset:
    - Weakly labeled with 527 sound classes.
    - Clip level labeled. No onset-offset information.
    - Each clip may contains multiple labels.



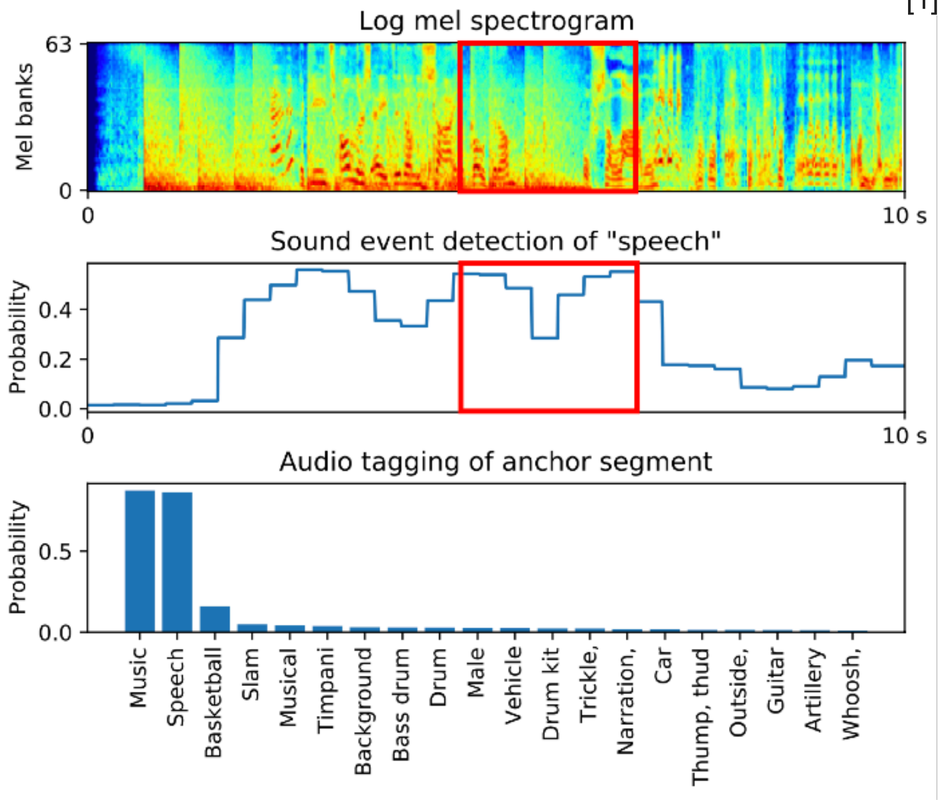
Speech Enhancement

Training phase

- Method: $f(s_1 + s_2 \,|\, c) \mapsto s_1$

1. The selection of s_1 and s_2.
   - s_1, s_2 should have disjoint labels.
2. The generation of condition c.
   - $c = \text{max\_pool}(f_{SED}(s_1))$
   - SED: Sound Event Detections[2]
3. The modeling of $f(\cdot)$:
   - A IRM based Conditional-UNet.

[1]



[1] Kong, Qiuqiang, Haohe Liu, Xingjian Du, Li Chen, Rui Xia, and Yuxuan Wang. "Speech enhancement with weakly labelled data from AudioSet." *arXiv preprint arXiv:2102.09971* (2021).

[2] qiuqiangkong. qiuqiangkong/panns_inference. GitHub. Published August 17, 2020. Accessed November 24, 2021. https://github.com/qiuqiangkong/panns_inference