# NTT Multi-Speaker ASR System for the DASR Task of CHiME-8 Challenge

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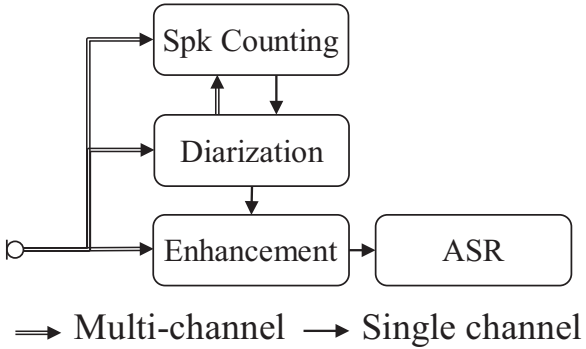
# Overall pipeline

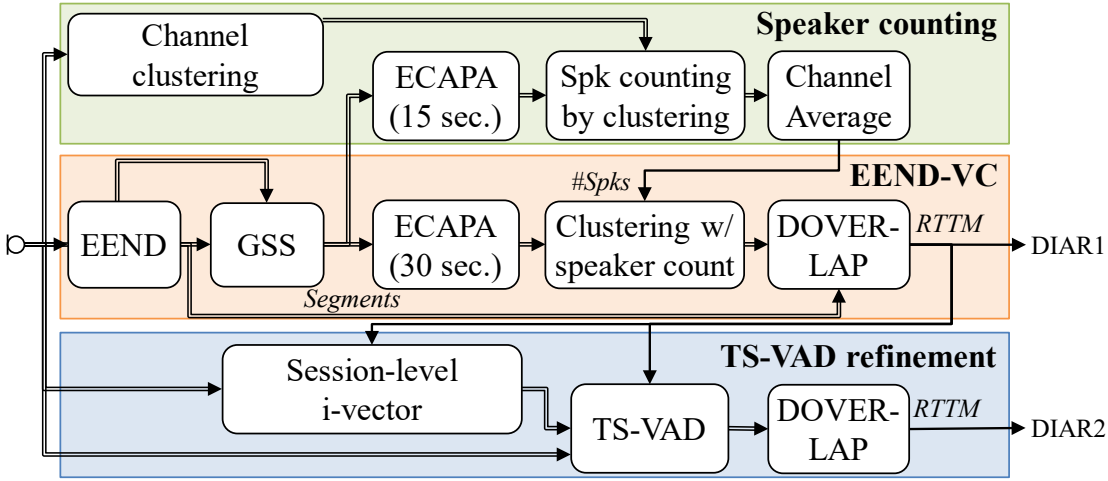



Similar pipeline to baseline:

1) Diarization
   - E2E neural diarization with vector clustering(EEND-VC) and with TS-VAD refinement
2) Multi channel speech enhancement
   - Guided source separation(GSS) in official baseline with several modifications
3) ASR
   - Four ASR models combination with LM rescoring

We achieve 22.0 % tcpWER for task1 and 59 % of relative improvement over the NEMO baseline, and 16.8 % tcpWER for NOTSOFAR1 scenario

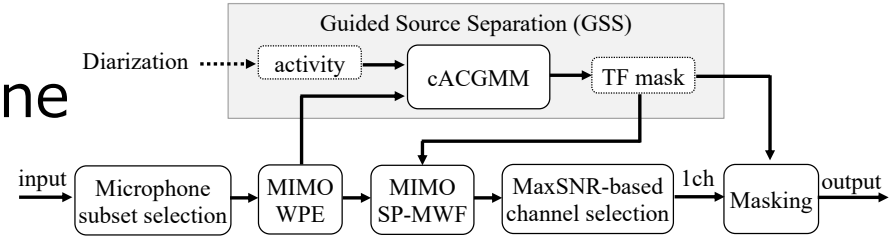
# Diarization




- Consists of three parts
  - Segmentation by EEND-VC
    - EEND diarization on 30 sec. chunks
      + GSS
      + speaker embedding clustering
  - Speaker counting by clustering
    - Different from EEND-VC, specific for counting
    - Clustering across microphone channels
  - TS-VAD (NSD-MS2S [G. Yang, 2024]) refinement
    - Same model as CHiME7 winner
- DOVER-LAP for combination of multi-channel results

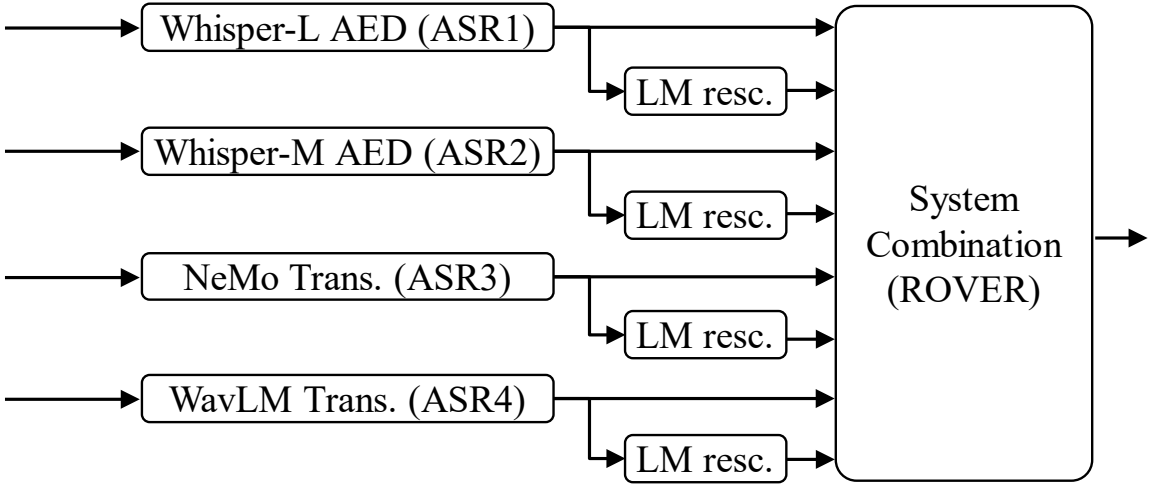
# Multi channel speech enhancement

- Based on GSS in Nemo baseline
- Several modifications




| | Nemo baseline | NTT system |
|---|---|---|
| Microphone subset selection | Top 80% mics based on EV (Envelop variance) | New rule based on EV and $C_{50}$ (Room acoustic estimation) |
| Beamformer | Souden MVDR | Spatial-prediction multichannel wiener filter (SP-MWF) [J. Benesty, 2008] |
| Post processing | Applying BAN(Blind Analytic normalization) & TF-mask | Without BAN & TF-mask |

# ASR




- Build four ASR models
  - Finetuning Whisper,  Nemo baseline, etc.
- Apply LM rescoring for each ASR models
- Using ROVER for system combination

# Results

We submitted three systems:

| ID | Diar | ASR | NOTSOFAR1 tcpWER | Macro tcpWER | RTF |
|---|---|---|---|---|---|
| **Baseline** | NeMo | - | 61.0 | 53.2 | - |
| **NTT-1** | DIA1 (EEND-VC) | ASR4 (Transducer) | 22.1 | 27.2 | 2.46 |
| **NTT-2** | DIA2 (EEND-VC + TS-VAD) | ASR1 (Whisper Large) | 18.3 | 24.3 | 3.14 |
| **NTT-3** | DIA2 (EEND-VC + TS-VAD) | ASR5 (ROVER) | 16.8 | 22.0 | 4.03 |

# Thank you for listening!

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