SPEECH ENHANCEMENT ALGORITHMS, DATA GENERATION & EVALUATION

Project Aim

Provide a flexible framework for data generation and evaluation of speech enhancement algorithms aimed at reducing interferent speech, noise, and reverberation for distant speech in conference rooms.

- Baseline algorithm: ISCLP Kalman Filter proposed by Thomas Dietzen.
- Enhancing ISCLP-KF with machine learning.

2025 Goal

Implementation of functional framework with:

- Flexible configuration options
- Evaluation of baseline and enhanced algorithm
- Training and validation for machine learning models

Future Work

- Expand framework (Noise sources, conversation scenario)
- Estimation of other parameters with machine learning

2025 Framework

Flexible Data Generation

Configuration Options:

- Sources (speakers, movement, locations and directions)
- Rooms (dimensions, RT60, mic placement)
- Sample Rate, STFT settings
- Clean speech files from DNS-Challenge
- Number of rooms and scenarios

Algorithms & Evaluation

- Flexible Algorithmic Choice
  - ISCLP-KF
  - ISCLP-KF using neural network
  - Implement your own
- Metrics Evaluation
  - PESQ, E-STOI, SRMR, DNSMOS