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Diart: A Python Library for Real-Time Speaker Diarization

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Summary

The term “speaker diarization” denotes the problem of determining “who speaks when” in a recorded conversation. Among other reasons, it has attracted the attention of the speech research community because of its ability to improve transcription performance, readability and exploitability. Speaker diarization in real-time holds the potential to accelerate and cement the adoption of this technology in our everyday lives. However, although “offline” systems today achieve outstanding performance in pre-recorded conversations, additional problems of “online” real-time diarization, like limited context and low latency, require flexible and efficient solutions enabling both research and production-ready applications.

Statement of need

`Diart` is a Python library for real-time speaker diarization. It leverages data structures and pre-trained models available in `pyannote.audio` (Bredin et al., 2020) to implement production-ready real-time inference on a variety of audio streams like local and remote audio/video files, microphones, and even WebSockets. Moreover, `Diart` was designed to facilitate research by providing fast batched inference and hyper-parameter tuning thanks to and in full compatibility with `Optuna` (Akiba et al., 2019).

`Diart` was designed with an object-oriented API fully capable of extension and customization. Streaming is powered internally by ReactiveX extensions, but available “blocks” allow users to mix and match different operations with any streaming library they choose. A prototyping tool with a CLI is also provided to quickly evaluate, profile, visualize and optimize custom systems.

`Diart` is based on previous research on low-latency online speaker diarization (Coria et al., 2021) and allows to reproduce its results. It has also participated in the recent Ego4D Audio-only Diarization Challenge (Grauman et al., 2022), outperforming the offline baseline by a large margin. We hope `Diart`’s flexibility, efficiency and customization will allow for exciting new research and applications in online speaker diarization.

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