vicDIVA
Evaluation Kit for Distant Voice Acquisition

Robust far-field speech acquisition capabilities are a major prerequisite for the use of voice control in smart homes, voice assistants or voice-controlled user interfaces for industrial plants and machines, as well as for modern communication systems.

voice INTER connect offers a dedicated collection of algorithms for these use cases, that enable highest-quality far-field acquisition of voice signals using multiple microphones. The algorithms can be tailored and configured to the customer's needs. This way, it is possible to control devices via voice even if they are several meters away and/or in the presence of simultaneous noise or several concurrent speakers. With the vicDIVA evaluation kit, beamforming algorithms can be individually configured and evaluated in customer-specific applications. In addition to the manual spatial alignment of the signal acquisition, automatic localisation techniques - optionally taking into account sources of interference - can also be used. vicDIVA consists of a microphone array with 8 microphones and status LEDs, the hardware module vicSBM for processing the microphone signals, and a Raspberry Pi that is used for application development and power supply. The improved audio signal is provided with low latency via an ALSA interface to applications on the Raspberry Pi.

The achieved speech quality can also be evaluated directly with additionally connected headphones.

PRODUCT FEATURES

- Evaluation kit with algorithms for robust far-field speech acquisition
- Suppression of background noise and other sources of interference such as reverberation and acoustical reflections
- Manual spatial alignment of signal acquisition or alternatively automatic speaker localisation
- Low audio latency and high speech signal quality

APPLICATIONS

- Intercom systems in industrial environments
- Voice-controlled devices and industrial plants
- Voice control in smart homes
- Speech assistants
- Video conferencing
- Medical technology

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COMPONENTS

No. Description

1. vicMICM8 microphone array
2. Raspberry Pi 3B+ with vicSBM (DSP extension board)
3. SD card with Raspbian image and ALSA sound card driver
4. Tripod
5. Data cable microphone array
6. Power supply
7. Extension cable for headphone connection
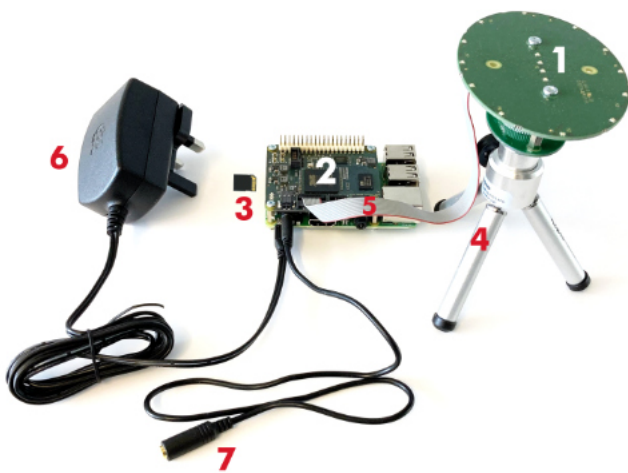
SPECIFICATION

Operating temperature:	-40 °C ... 85 °C
Dimensions (L x B x H)	
- Microphone array:	(100 x 70 x 3) mm
- Processing unit (incl. Raspberry Pi):	(87 x 59 x 28) mm
Power supply:	USB

RASPBERRY PI HOSTSYSTEM

- Provision of improved audio signal via ALSA driver
- Configuration of vicSBM (via ALSA):
  - Beamforming methods and parameters
  - Performance of noise reduction
  - Automatic speaker localisation
  - Output volume
  - LED control

SETTING OPTIONS

General

Processing:	Switching beamforming on / off (beamforming / bypass)
Volume:	Output volume for beamforming mode
Bypass Volume:	Output volume for bypass mode
LED R/G/B:	LED intensity per colour channel (red / green / blue)

Directional Characteristics

Azimuth:	Describes the horizontal angle of the beam direction; it is automatically determined when speaker localisation is activated
Elevation:	Describes the elevation angle between the surface of the microphone array and the beam direction; it must always be set manually
Directivity:	Describes the strength of spatial noise suppression

Speaker Localisation

Beamsteering:	Switching the operating mode (Manual / Auto / Auto Noise-Aware) of automatic localisation with optional noise suppression
Act. Threshold:	Minimum sound level for speaker localisation (detection threshold)
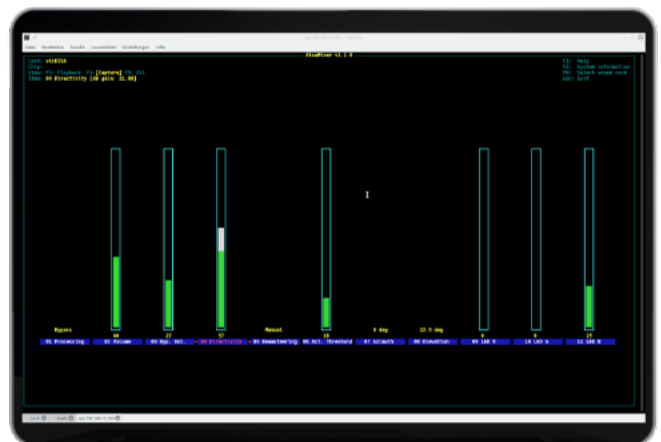
Configuration of vicDIVA via ALSA interface