Open community platform for hearing aid algorithm research

Hendrik Kayser
Tobias Herzke, Frasher Loshaj, Giso Grimm and Volker Hohmann

Digital hearing devices
Medizinische Physik and Cluster of Excellence Hearing4all
Carl von Ossietzky University Oldenburg

06/26/2017

What?

- Open-source software for hearing aid algorithm development and evaluation
- Low-delay (< 10 ms), real-time signal processing framework

open
Master
Hearing
Aid

The *open Master Hearing Aid* - openMHA

What?

- Open-source software for hearing aid algorithm development and evaluation
- Low-delay (< 10 ms), real-time signal processing framework

Why?

- Proprietary systems that are not accessible to the research community and underlie commercial constraints
- Facilitation of collaborative efforts and reproducibility in hearing aid research
- Lower barriers for accelerated studies with novel algorithms
- Smooth transfer of research results into application

open
Master
Hearing
Aid

The *open Master Hearing Aid* - openMHA

What?

- Open-source software for hearing aid algorithm development and evaluation
- Low-delay (< 10 ms), real-time signal processing framework

Why?

- Proprietary systems that are not accessible to the research community and underlie commercial constraints
- Facilitation of collaborative efforts and reproducibility in hearing aid research
- Lower barriers for accelerated studies with novel algorithms
- Smooth transfer of research results into application

open Master Hearing Aid

When?

- First major release available since **June 21, 2017** on GitHub

Project partners and support

Who?

University of Oldenburg

HörTech gGmbh (Oldenburg)

Bat&Cat SoundLabs (Palo Alto)

Project partners and support

Who?

University of Oldenburg

HörTech gGmbh (Oldenburg)

Bat&Cat SoundLabs (Palo Alto)

... pays?

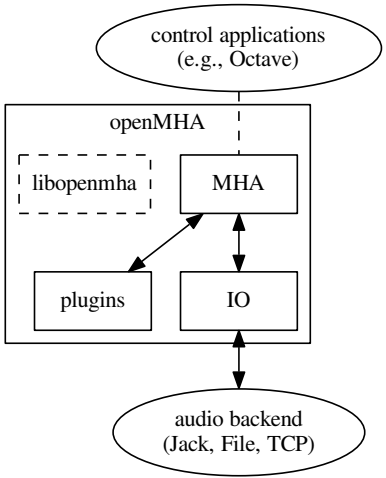
Funding

National Institutes of Health initiative to develop real-time portable signal processing tools for advancing research on hearing loss compensation (NIH Grant 1R01DC015429-01)

Ingredients

Basic framework for implementation of algorithms

- MHA host application
- libopenmha toolbox
- communication interfaces to control applications and for audio I/O
- runtime configuration changes



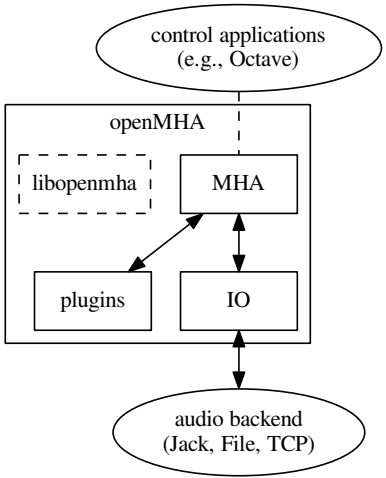
Ingredients

Basic framework for implementation of algorithms

- MHA host application
- libopenmha toolbox
- communication interfaces to control applications and for audio I/O
- runtime configuration changes

Tools and documentation

- Octave/Matlab GUI for hearing aid fitting
- manuals for different usage scenarios
- example configuration files for algorithms included



Ingredients

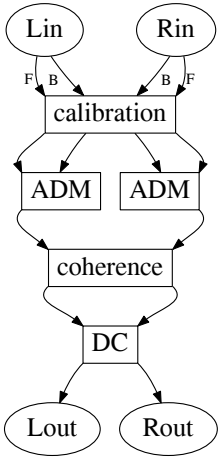
Hearing aid processing plugins

- calibration
- multi-band dynamic compressor (DC)
- feedback reduction

Ingredients

Hearing aid processing plugins

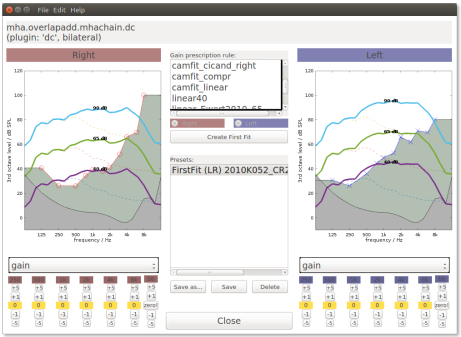
- calibration
- multi-band dynamic compressor (DC)
- feedback reduction
- binaural coherence filter
- bilateral adaptive differential microphones (ADM)
- beamforming algorithms (delay-and-sum, MVDR)
- single-channel noise suppression



Target groups

Audiological researchers

- Measurements out-of-the-box on PC hardware
- Change parameters on application level

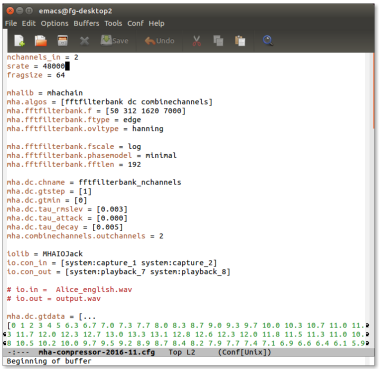


I Audiological researchers

- Measurements out-of-the-box on PC hardware
- Change parameters on application level

II Application engineers

- Set up measurement tools and customize algorithms
- Access configuration interface at an advanced level



Target groups

I Audiological researchers

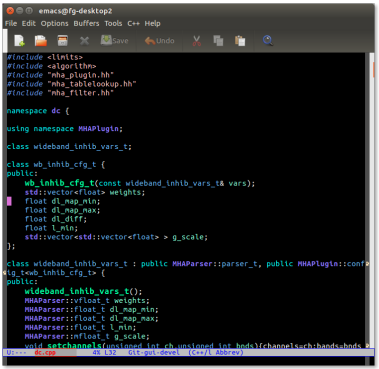
- Measurements out-of-the-box on PC hardware
- Change parameters on application level

II Application engineers

- Set up measurement tools and customize algorithms
- Access configuration interface at an advanced level

III Plugin developers

- Develop and implement new plugins in the openMHA framework



I Audiological researchers

- Measurements out-of-the-box on PC hardware
- Change parameters on application level

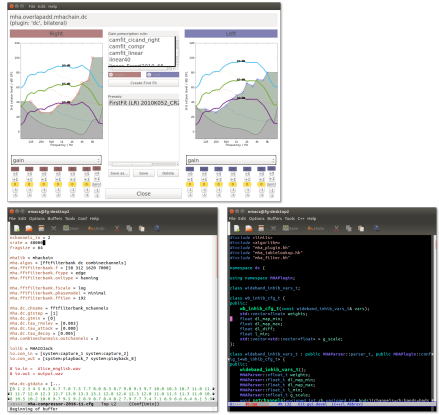
II Application engineers

- Set up measurement tools and customize algorithms
- Access configuration interface at an advanced level

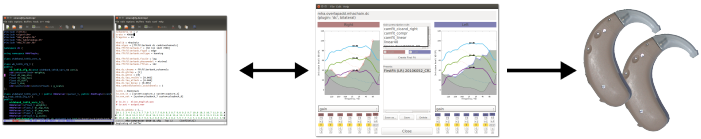
III Plugin developers

- Develop and implement new plugins in the openMHA framework

... work on **one** platform.



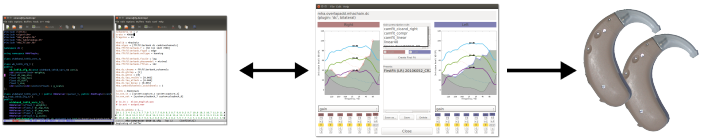
Summary & Outlook



The **openMHA**

- ... provides a real-time processing platform for hearing aid algorithm development.
- ... is designed to evaluate, compare and bring into application novel hearing aid algorithms for future hearing aid generations.
- ... runs on standard PC and sound hardware (Linux OS, more to come) as well as Beaglebone Black ARM and similar platforms.

Summary & Outlook



The **openMHA**

- ... provides a real-time processing platform for hearing aid algorithm development.
- ... is designed to evaluate, compare and bring into application novel hearing aid algorithms for future hearing aid generations.
- ... runs on standard PC and sound hardware (Linux OS, more to come) as well as Beaglebone Black ARM and similar platforms.
- ... will be further extended based on latest research and contributions from the hearing aid research community.

Get openMHA

openMHA is open source under AGPL-3.0 license

Latest news:

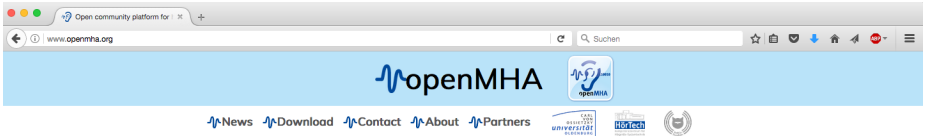
- www.openMHA.org

Open source code available here:

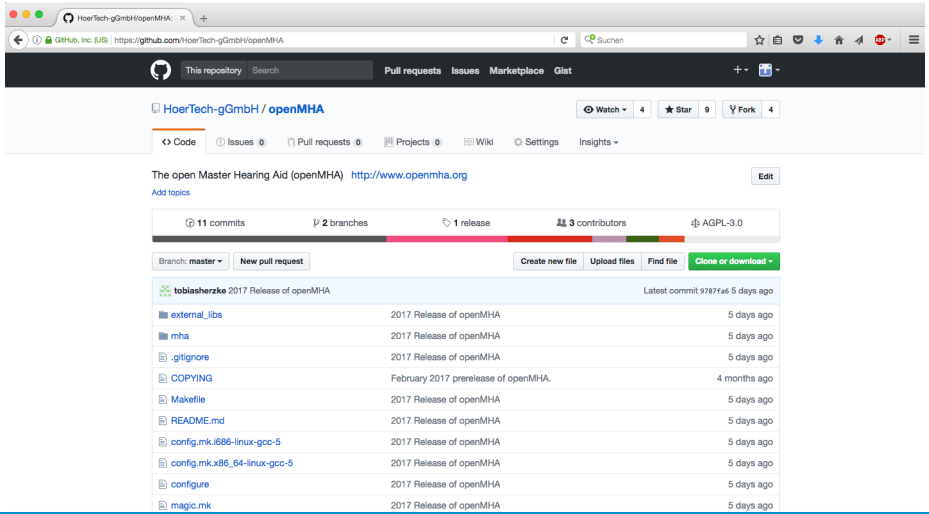
- https://github.com/HoerTech-gGmbH/openMHA

Disclaimer Research reported in this publication was supported by the National Institute On Deafness And Other Communication Disorders of the National Institutes of Health under Award Number R01DC015429. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Get openMHA


Open community platform for
www.openmha.org
Suchen
openMHA
News
Download
Contact
About
Partners
Open community platform for hearing aid algorithm research
The project *Open community platform for hearing aid algorithm research* funded by the National Institutes of Health (NIH Grant 1R01DC015429-01) aims at sustainable, focused research towards improvement and new types of assistive hearing systems.
Project Overview (pdf)
openMHA is an open-source software platform for real-time audio signal processing. For download instructions see **Download**.
!!! Latest news: 2017 Release of openMHA available
See **News** for more information and annoucements.
OpenMHA 2017

Get openMHA


HoerTech-gGmbH/openMHA: ×
GitHub, Inc. (US) https://github.com/HoerTech-gGmbH/openMHA
Suchen
This repository Search
Pull requests Issues Marketplace Gist
HoerTech-gGmbH / openMHA
Watch 4 Star 9 Fork 4
Code Issues 0 Pull requests 0 Projects 0 Wiki Settings Insights
The open Master Hearing Aid (openMHA) http://www.openmha.org
Add topics
Edit
11 commits 2 branches 1 release 3 contributors AGPL-3.0
Branch: master New pull request
Create new file Upload files Find file Clone or download
tobiasherzke 2017 Release of openMHA
Latest commit 9787fa6 5 days ago
external_libs 2017 Release of openMHA 5 days ago
mha 2017 Release of openMHA 5 days ago
.gitignore 2017 Release of openMHA 5 days ago
COPYING February 2017 prerelease of openMHA. 4 months ago
Makefile 2017 Release of openMHA 5 days ago
README.md 2017 Release of openMHA 5 days ago
config.mk.i686-linux-gcc-5 2017 Release of openMHA 5 days ago
config.mk.x86_64-linux-gcc-5 2017 Release of openMHA 5 days ago
configure 2017 Release of openMHA 5 days ago
magic.mk 2017 Release of openMHA 5 days ago

Get openMHA

openMHA is open source under AGPL-3.0 license

Latest news:

- www.openMHA.org

Open source code available here:

- https://github.com/HoerTech-gGmbH/openMHA

Disclaimer Research reported in this publication was supported by the National Institute On Deafness And Other Communication Disorders of the National Institutes of Health under Award Number R01DC015429. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.