

Summary WG 03, "Future Sound Tech Solutions" – Meeting #04

At the meeting on September 22, 2021, discussions and planning of webinar events took place. A summary of the meeting is included below.

Progress: The working group is now up to speed in preparing for events under the theme of "Future Sound Tech Solutions" and more events are in the pipeline from the group.

Proposals for Webinars

#	Subject	Background
1a	AI/Machine learning (ML)	<p>Contacts established with Adam at Edge Impulse.</p> <p>Two workshops from Edge Impulse are in planning, one for late 2021, the other for start of 2022:</p> <ul style="list-style-type: none"> • Consumer products • Pro equipment <p>Participants can download an APP to their mobile phones, and there is no need for additional equipment, hence no fees.</p> <p>(Hands-on experience on AI using the 'Edge Impulse' on machine learning webinar, e.g. in relation to audio (www.edgeimpulse.com))</p>
1b	AI in signal processing (4-5 short presentations)	<p>Speakers and content for a webinar on AI in signal processing for audio basically ready for an event:</p> <ol style="list-style-type: none"> 1. AI in signal path, future trends, Oticon (Niels Pontoppidan) 2. AI in signal path, headset, Epos (Torben Christiansen, Kim Larsen) 3. Deep Noise suppression, Jabra (Clément Laroche) <p>Titles and abstracts still need to be tabled by the speakers. The three speakers will coordinate between themselves, who talks about what.</p>
1c	AI in signal processing	<p>Jan Skoglund (Google) has accepted to speak at Danish Sound Day (most likely through Conference call):</p> <p>Theme: Quality of speech and other issues</p>
2	Start-up companies to present their business (webinar)	<p>Goal to have 3-5 start-up companies to present their business and goals. Proposed candidates:</p> <ul style="list-style-type: none"> • Auricle bone conductors, Pedro Costa • SOWA • DTU group (Jermy to provide details) <p>Target audience & aims: General info, investors (to be invited), assist start-ups in obtaining contacts, involve students with ambitions to start a company, etc.).</p> <p>Possibly include REACT project info.</p>
3	Redress the great achievements of audio – and address the reality of unsolved audio challenges.	Postponed

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4	Audio and 'privacy'	<p>Lars Thinggaard has accepted to give a Keynote presentation at SoundDay 2021 on matters outlined in his book "Tech for Life" co-written with Jim Hageman Snabe, chairman of A.P Møller and Siemens, Germany.</p> <p>Lars will focus on the "technology pledge" and future technologies and their impact on society.</p> <p>The general topic on Audio and 'privacy' still needs to be re-initiated, and the working group is invited to come up with creative ideas.</p>
5	Digital meetings and audio	<p>Jan Skoglund, Google will at SoundDay 2021 cover some elements. Consensus in the group that most progress in the area is today coming from the big Tech Companies in Silicon Valley, Apple, Google, Facebook, Microsoft, etc.</p> <p>Danish companies in the area are users of the technology from the big Tech Companies, but also in several cases serve as Partners.</p> <p>Not much has happened on the topic in academic environments for the last 15 years.</p> <p>However, in relation to Cognitive Load, i.e. people getting tired, it seems to be an important focus area for academia in current years.</p> <p>In addition, current digital meetings support-tools like "Teams", do not yet support multichannel sound. Multichannel sound could enhance meetings in making the speech sources appear more natural in a stereo like manner. Multichannel speakers could help the understanding and reduce fatigue problems in meetings.</p> <p>It was identified that Danish R&D environments, despite the obvious importance, may have a challenge in fitting these themes in applications for EU funding. Money seems to be available, but somehow it is difficult to set up the right approach to ensure funding from EU. DSC could play a role here.</p> <p>DSC has been approached by a start-up company that want to include bio-sensors, and biosensors in general could also be an important focus, e.g. in use in headset</p>
6	Multisensory processing	<p>Webinar to held on December 7th, 2021. Focus om enhancing audio quality for not least hearing-impaired people.</p> <p>Confirmed speakers:</p> <ul style="list-style-type: none"> • Jeremy Marozeau, DTU • Claire Richards • Kumar Efgots, AAU ?
7	Green footprint of audio streaming	<p>Green footprint on streaming a big issue for the "the big players", but difficult at present to see a specific 'Danish angle' to the challenge.</p> <p>In reducing the computation to make things smaller to fit into e.g. headset, we also reduce the green impact.</p> <p>Consensus in the group that we should consider the green impact and the adhesion to UN's 17 world goals for every project we launch.</p> <ul style="list-style-type: none"> • How does streaming influence the green footprint? • How can we balance one option against another? <p>So a green initiative could mean that we try to outline a set of general rules to consider every time we start a new project. What is the impact, if we choose option "A", what if we choose option "B" etc.?</p> <p>Cont'd next page</p>

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7	Green footprint of audio streaming. Cont'd	In the context of DSC, we may try to launch a project that could come up with guidelines to consider at the time of start of every new development project. We agree that we will never have very accurate models, but at least, if we have the mindset of trying to balance solutions to the best of our knowledge, there could be a significant impact on how we develop new technology – also in the sound domain. Attempting to make budget for green impact could be a serious strategy for selection of development goals and strategies. The theme will be an ongoing activity that we improve over time along with growing understanding of the essentials. Will be discussed again in future meetings.
8	Sensors of the future	Today audio sensors are mostly stand-alone solutions. However, in the future sensors will be integrated into all kinds of products. How will that influence the traditional sensor market? We should also include new materials for audio sensors. Speakers (Jabra unable to participate): <ul style="list-style-type: none"> • Bin Liu, HBK • Morten Wagner, Idemo Labs, FORCE • Sergei Rotger Griful (Eriksholm) • Others (e.g. Auricle-Pedro Costa)?
9	'Personalization' of user needs	Confirmed speakers: <ul style="list-style-type: none"> • Oliver Townend (WSA) • Bert de Vries (GN Hearing) • Nick Zacharov (FORCE) Date to be confirmed Sean Olive also confirmed, but proposal to use his contribution in 'separate event on "Listening preferences"'
10	Use of pre-simulated data	Neural networks can be trained using synthetic data to push the use in audio neural network applications. This is cheaper, more efficient and do not require e.g. the Google codec. For now, focus on low bandwidth codecs for AI applications. Train neural networks using synthetic data. Confirmed speakers: <ul style="list-style-type: none"> • Toon van Waterschoot, ESAT, Leuven Others? <ul style="list-style-type: none"> • Acoustic simulation could also be included in the theme. For now the outline is immature, and we need to give it more substance at next meeting. One WG member will try for the next meeting to come up with suggestions.
11	Perceptual audio evaluation one-o-one	Webinar planned for October 13, 2021 https://danishsoundcluster.dk/perceptual-audio-evaluation/ Speakers: <ul style="list-style-type: none"> • Nick Zacharov, FORCE • Jan Skoglund, Google • Charlotte Sørensen, GN Hearing

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12	'Sound Day 2021 keynote	<p>Mikkel E.G. Nielsen, Oscar winner 2021 on his editing on the film "Sound of metal" give presentation, e.g. a keynote at the Sound Day 2021.</p> <p>The movie is about a drummer, who loses hearing and obtains a cochlear implant. Mikkel Nielsen was the sound guy in the field and then he was selected to edit the film.</p> <p>Confirmed and will include sound designer Nicolas Becher</p>

Proposals for collaborative projects

No discussions on the projects at Meeting #02 took place, so details below are from Meeting #01.

#	Subject	Background
A	Technology roadmap for audio	<p>Music productions have in recent years focused on compression, enhancing transfer bandwidth, but sacrificing quality ('old dynamic bandwidth lost'). How can we improve on streaming and other quality aspects?</p> <p>Generations of audio solutions, and how do we disseminate the results to a wider audience?</p> <p>Should not focus on technology on its own right, but rather on use cases, and possibly on the issue of data collection for AI. Technology itself is not the prime focus for Danish companies, instead focus should be on how to optimally use the available technology, i.e. on the problems that need to be solved.</p> <p>In addition to Jonas's proposal, we should address all possible dimensions, e.g.:</p> <ul style="list-style-type: none"> • Products • Product experiences • Services • Etc.
B	Data collection in conjunction with AI and use of pre-simulated data	Data collection for use in AI applications and training in conjunction with training using pre-simulated data could be shared among several companies, like previous projects between DTU, B&O, Harman, B&K, etc. that led to several publications.
C	Tutorials on AI etc. for students and PhDs	AI, data collection, training of neural networks etc. could be an interesting area to develop tutorials for.

Next meeting

To be called by Doodle, most likely second half of November, 2021

Appendix 1: Participants in the meeting

Mads G. Christensen	AAU	Professor
Clément Laroche	GN Audio - Jabra	Senior Research Scientist
Morten Kroman	WS Audiology	VP R&D Electronics
Jeremy Marozeau	DTU Hearing Systems	Assistant professor
Niels Pontoppidan	Eriksholm Research Centre	
Birger Schneider	CHAMAJ Consult ApS	Director
Torben Vilsgaard	Danish Sound Cluster	Director
Shelley Uprichard	Danish Sound Cluster	Project Manager