Danish Sound Cluster

Summary WG 03, "Future Sound Tech Solutions" – Meeting #02

At the meeting on **June 3, 2021**, more detailed discussions and planning of webinar events took place. A summary of the meeting is included below:

Proposals for Webinars

#	Subject	Background
1	AI/Machine learning (ML)	Hands-on experience on AI using the 'Edge Impulse' on machine learning webinar, e.g. in relation to audio (www.edgeimpulse.com) is attractive. It requires that all participants have access to hardware (cost 250 DKK/person). DSC will investigate, if DSC can finance the costs of hardware to all participants, or if we instead should charge 250 DKK per participants for joining the event. In addition to the AI webinar planned for June 16 (focus on analysis) AI for audio, specifically on the signal part is preferable. This is currently lacking. Proposed speakers: • Thomas Behrens, Eriksholm • EPOS, *Torben Christiansen, Director of Technology og Kim Larsen, Head of Audio Engineering*). • Furthermore, the following volunteered to give small presentations on signal processing in audio using AI: *Mads Græsbøl Christensen, Niels Pontoppidan, Clément Laroche.* The AI webinar on signal processing of audio could fit into an event to be held in September and aiming at 4-5 presentations possibly limited to about 20 minutes each to offer a lively event.
2	'Futurist' session	A session engaging futurists, e.g. Liselotte Lyngsøe, Peter Leyden, Silicon Valley, etc. fits better into the Sound Day event that we plan for November 2021. It was proposed to plan for a webinar event, where we invite e.g. 3 start-ups to talk about their plans for the future. DSC is currently investigating the possibility of obtaining more funding for such activities.
3	Redress the great achievements of audio – and address the reality of unsolved audio challenges.	Interesting theme, and one that we should try sometimes in the future. However, for now it is not fully mature, and we put it at rest until later.
4	Audio and 'privacy'	Clearer objectives are needed. A subcommittee will try to provide answers. If we cannot provide answers, at least show examples of privacy concerns in relation to audio. A proposal to include Lars Thinggaard, editor of a new book "Tech for life" (coediting together with Jim Hageman Snabe, chairman of A.P Møller and Siemens)

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5	Digital meetings and audio	At present, companies trying to do things in this field are operating at the mercy of Google, Zoom, Microsoft (Teams), etc. Difficult for companies to see how, they could contribute to improve. A WG member has experience with high performance audio in relation Zoom (option for low latency, high performance). WG4 on "Creative Sound Technologies" are currently working on setting up a webinar on AR/VR, and we could possibly assist. For now, we leave the theme for WG 4, but at a later point in time, we may follow up with "what can you actually do" and some highlight on what is currently possible.
6	Multisensory processing	Include all senses in use. However, emphasis of enhancing audio quality for at least hearing-impaired people is essential. At present, not many companies in Denmark active in this field, but international options exist. We can aim at both presentations and a panel discussion. Important to avoid sales pitches from companies. Focus on technical achievements and challenges. In addition to DTU, possibly also AAU-CPH (Stefania Serafin) could speak.
7	Green footprint of audio streaming	Green footprint on streaming a big issue for the "the big players". Streaming is 'energy hungry'. At present difficult to see a specific 'Danish angle' to the challenge. We put the theme at rest for now.
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. At present a webinar theme is a little premature, but companies like HBK (Brüel & Kjær), G.R.A.S and other may contribute. Several international possibilities.
9	'Personalization' of user needs	Start up with different groups of hearing-impaired people and then move on to groups of consumers. General agreement in the group that this is a hot topic of interest of several of the involved companies. Possible inputs from international speakers, e.g. Shaun Ollivance ? Several working group members volunteered to speak or to offer good candidates: More candidates for speakers in presentations are needed.

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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 and do not require e.g. the Google codec.
		The topic could be integrated into the machine learning (ML) webinar discussed earlier on. In essence, ML is up to 90% an issue of data generation.
		The theme can be made broad, even including visual, if that is attractive. Clément may be able to point to people in his own organization that could contribute.
		WG 4 also have thoughts in the same direction (using AI to simplify recording), so one option is to coordinate with WG 4. The other is to include e.g. one presentation on the topic in a more general ML webinar.
		Possibly also a 'green' angle to this topic. Using simulated data can make training more efficient ('greener'), since people do not need to go out in the field for establish data for several tasks.
		We will await the discussions in WG 4 to see, if a presentation should be included in a webinar of theirs, or alternatively in an ML webinar organized by our working group.
11	Perceptual audio evaluation one-o-one	Different types of people have individual needs Overall quality and preference is one thing, objectify the perception of quality using different tools is another. Depending on the group of people we obtain slightly different data. • Nick Zacharov volunteered to give a presentation and will invite several people from around the world. We need better methods of quality measures. For example, Google (new very low-bitrate codec for speech compression) has recently announced some interesting results on even low bit rate using AI, but the challenge is that training of networks using existing measures are inadequate. More speaker names are needed.
12	'Sound Day 2021 keynote	Proposes to have Mikkel E.G. Nielsen, Oscar winner 2021 on his editing on the film "Sound of metal" give presentation, e.g. a key-note at the Sound Day 2021. 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.

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	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? Generations of audio solutions, and how do we disseminate the results to a wider audience? 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. In addition to Jonas's proposal, we should address all possible dimensions, e.g.: - 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

Monday August 9, 14:00 to 15:00

Appendix 1: Participants in the meeting

Mads G. Christensen	AAU	Professor
Efren Fernandez Grande	DTU Electro, Electrotechnology	Assistant professor
Jeremy Marozeau	DTU, Hearing Systems, Health technology	Assistant professor r
Nick Zacharov	FORCE Technology	Senior Consultant
Jens Kaas Benner	Alexandra Institute	Head of AI and Data Analytics Lab
Niels Pontoppidan	Eriksholm Research Centre	
Clément Laroche	GN Audio - Jabra	Senior Research Scientist
Morten Kroman	WS Audiology	VP R&D Electronics
Jonas Raun Hansen	GN Hearing A/S	Manager, Electro Acoustic
Mikael Vest	NTP Technology A/S	Sales Director, M.Sc.E.E
Birger Schneider	CHAMAJ Consult ApS	Director
Torben Vilsgaard	Danish Sound Cluster	CEO
Shelley Uprichard	Danish Sound Cluster	Project Manager