

Summary: "Future Sound Tech Solutions" – Meeting #12

Meeting # 12 in working group "Future Sound Tech Solutions" took place on **March 20, 2023**.

The meeting agenda was:

1. Webinars:
 - a. Follow-up on proposals and ideas from meeting # 06 including additional comments and proposals.
 - b. Proposals for possible speakers
 - c. New themes?
2. Physical events during 2022
 - a. Meetings? Workshops? Others?
3. Collaborative projects, update of proposals, indication of possible project consortia
4. Other ideas for Danish Sound Cluster activities
5. A.O.B.

A new team member of Danish Sound Cluster, Jens Nedergaard, presented himself.

Summary details

See the following pages.

Ad 1a & 1b: Proposals for Webinars

#	Subject	Background
8	"Emerging Acoustic Sensor Technologies and Applications"	Webinar event successfully delivered on March 14, 2023
14.a 14.b	Feedback and noise cancellation	<p>Time schedule: May 9th, 2023</p> <p>Focus on research in the cancellation realm, be that feedback, environmental noise or other noises that must be removed from the desired sonic result.</p> <p>Speakers:</p> <ul style="list-style-type: none"> • Meng Guo, Principal Researcher at Demant-Oticon • Simon Doclo, Professor at University of Oldenburg • Diego Caviedes Nozal, Research Scientist at Jabra • Franz Heuchel, Postdoctoral Researcher at DTU <p>Planned and is announced on the WEB</p>
15	Speech Prediction	<p>A topic on its own right - and interests seem high. However, difficult to find speakers. The aim is to find an approach to overcome the middle frequency range challenge, where existing solutions appear to fail.</p> <p>Shelley is struggling to find speakers, but have not been successful up to now, despite many discussions. Can anyone point to on-going interesting R&D work in the area? WE NEED HELP!</p> <p>Background:</p> <p>Active noise cancellation, ANC, can remove low frequency noise and passive noise cancellation can remove high frequency elements.</p> <p>However, noise related to speech in between the two regions remain an issue. ANC will never be able to suppress noise related to speech in the middle frequency range. Can the challenge be handled to some degree through employment of speech prediction to overcome this downside of in ANC?</p> <p>A difficult research topic, where speech modelling may have solutions. Today classic speech modeling has been overtaken by neural network approaches. Can original classic speech modeling prove a way ahead.</p> <p>Potential speakers:</p> <ul style="list-style-type: none"> • Johannes Sars ? (check with Niels)
17	Use of sound with robotics	<p>Time schedule: May 23, 2023</p> <p>The sound component may prove important in some applications using robotics.</p> <p>Speakers:</p> <ul style="list-style-type: none"> • Jonas Jørgensen, Associate Professor at University of Southern Denmark • Jesper Rindom Jensen, Associate Professor at Aalborg University • Christer P. Volk, Senior Specialist at FORCE Technology <p>Planned and is announced on the WEB.</p>

#	Subject	Background
18	'Sound Quality in Digital Meetings' (and in digital communication in general)	<p>Shelley is in contact with a Microsoft employee, previously a Fraunhofer employee, that may be able to give a presentation on the subject matter:</p> <ul style="list-style-type: none"> Sebastian Braun - Microsoft https://www.microsoft.com/en-us/research/people/sebraun/ <p>Tentative title: "DNN-based speech enhancement for real-time communication"</p> <p>Short abstract: In the last few years, fast progress has been made in research, adopting deep neural networks (DNNs) for audio signal processing tasks such as noise reduction, echo cancellation, speech detection and separation. In this talk, we show crucial steps how to design and train small and efficient DNNs under the challenging requirements of real-time communication pipelines as used in online meeting software on PCs and phones. Practical aspects such as balancing computational budget, quality aspects like speech distortion vs. noise reduction, and realistic evaluation methods will be covered.</p> <p>We are interested in finding contributions from competitors in the market. Need names and contact data for potential speakers. NEED HELP!</p> <p>Parallel Activity in Cellphones An interesting parallel is an upcoming standardization on a new CODEC, addressing quality in speech in cell phone communication worldwide, including digital meetings. The activity is a result of an upswing in immersive media services, such as the spatial or 'surround' audio experience.</p> <p>The partners of the standardization states, it will enable the sharing of immersive audio experiences from highly mobile and uncontrolled capture environments and the rendering of those experiences in other virtually unconstrained environments using headsets, earbuds or multi-speaker systems with custom loudspeaker configurations – in environments such as homes, cars or conference rooms.</p> <p>The 3GPP SA4 Codec is now closing the gap through standardization of its codec for Immersive Voice and Audio Services (IVAS), see: https://www.3gpp.org/technologies/ivas-highlights</p> <p>Potential speakers could be:</p> <ul style="list-style-type: none"> Stefan Bruhn (Dolby) or Markus Multrus (Frauenhofer) <p>Other companies involved in the development: Ericsson, Nokia, Orange, etc.</p>
20	AI and Sound in general	<p>No progress since last meeting. Pedro plans to follow up on the contacts set up with Per Bækgaard, but no info on progress has been tabled.</p> <ul style="list-style-type: none"> AI related to e.g speech, Assistant professor Per Bækgaard, <p>NLP: The topic area of natural language processing, NLP, related to e.g. the upcoming CoRaL project that is starting at Alexandra Institute, Alvenir and Corti/DTU. The project (3. Year project starts in March 2023 and will run for 3 years, budget 13 mio. DKK): First results envisaged in October 2023.</p> <p>The working group "Healthcare & Welfare" have agreed with Dan Sattrup Nielsen, Alexandra Institute, to run a first webinar on the topic already in October/November 2023. We will follow the work and discuss, if also our working group on "Future Sound Tech Solutions should engage in the topic.</p>

#	Subject	Background
21	Augmented sound in future society	<p>The aim of this topic is to look for directions in augmented sound that could pivot the Danish sound Industry into a future leading technologically position in sound – rather than just wait for trends to come to us from the outside.</p> <p>Directions to investigate could be:</p> <ul style="list-style-type: none"> • System devices • Metaverse, virtual/augmented audio (<i>Metaverse: Improved digital environment where it is possible to move seamlessly between work, play, shopping, socializing and creativity in one digital landscape</i>). • Bluetooth Auracast™ (<i>Auracast broadcast audio will let people invite others to share in audio experiences. People can log on to streams that are in the air. Is likely to change our society already short term</i>). <p>Of the three directions, Bluetooth Auracast is probably the one closest to implementations and one, where we could find speakers. It will also build upon one of the first Webinars, we had in DSC (Bluetooth LE with Nick Hunn - was very well accepted by the DSC audience).</p> <p>Potential Speakers:</p> <ul style="list-style-type: none"> • Nick Hunn, WiFore • Peter Liu, Pixel Ecosystem (Google) • Andrew Zignani, ABI Research • Mark Powel, Bluetooth SIC • Dr. Stefan Zimmer, EHIMA <p>Some universities are today visiting “Meta reality Labs” to learn about and get inspired of new directions. Can we identify any university people in DK that has already been in contact with Metaverse Labs (Efren has some involvement)?</p> <p>Another theme on augmented sound in future applications could be support of impaired people. We support the theme in an upcoming webinar on Haptics and Jawbone, but more may certainly be of interest, e.g. using sound to support blind people. The theme was addressed in a keynote at Sound Day 2019? By a research fellow at Microsoft UK (contacts through Nikolai Bisgaard). It could be interesting to follow up.</p> <p>Better tools and recording facilities for Podcast Production was addressed in the brainstorming. This theme is currently being handled in the working group “Creative Sound Solutions”. We encourage them to proceed and we support the need for webinars in the topic area.</p> <p>Noise added to electric cars for safety reasons was discussed. In general, noise in cities, sound scaping, sound or noise added to products are areas on their own right. Themes related to this are currently being handled by the working group “Environmental Sound Solutions”, so we leave such themes to that working group.</p> <p>However, a general theme on ‘Sound Pollutions’ could be of interest as a new theme. Added as an activity #24.</p> <p>One way to get inspired could be to brainstorm with a broader group of our traditional core members in Danish Sound Cluster, for example in conjunction with a Sound Day event – or similar physical event?</p> <p>In addition, bringing in people from other areas, e.g. philosophers, psychologists and others could possible augment an opening of views in our traditionally rather technologically fixated domain?</p> <p>Shelley will contact Nik Hunn and other in relation to the theme 'Bluetooth Auracast'</p> <p>Efren will try to identify people that can contribute to a theme on Metaverse - in the context of augmented sound. (e.g. Avi Bar-Zeev ?)</p>

#	Subject	Background
22	Text-to-speech	<p>Microsoft is reported to focus on text-to-speech in its Azure offerings. What will that mean to development in the sound sector.</p> <p>We will take a discussion at the next working group meeting.</p> <p>Jens to circulate a recent Microsoft article on the topic.</p>
23	Better tools for ensuring good audio quality in e.g. field recordings, hence reducing the need for dubbing	<p>A spin-off from the brainstorming on “Augmented sound in future society” could be the option for devising better tools for audio recordings in the field. We know from discussions in the working group “Creative Sound Solutions” that broadcast organization like DR and TV2 are actively interested in obtaining better tools for recording in the field for their journalists, so that dubbing activities can be reduced or avoided. Progress in areas like headsets and speaker phones involving widespread use of AI, might be a solution to the needs of journalists and broadcasting organizations.</p> <p>Various speech enhancement solutions may fit the needs. Actually, there are rather huge R&D activities in the field throughout the world that may have solutions, or are in the process of developing solutions that could fit into this context. It could prove of interest to broader group of people to hear about such tools and what they could be used for.</p> <p>Augmented audio support indications already at the time of recording may be another way of improving recordings in the field.</p> <p>We aim at setting up a subcommittee on this, bringing the users and providers together to see, if we can devise improved solutions. More awareness and bringing people together could be vital for further innovation.</p> <p>Birger will try to set up a small ad hoc sub committee to investigate, if we can bring the right people together. As a result, projects or themes on the topic could be the outcome.</p>
24	'Sound Pollution'	<p>As discussed during the brainstorming on ‘Augmented sound in future society’, sound is added to a lot of products and solutions – sometimes with rather meager or even negative effects. Is that what society needs?</p> <p>How can DSC assist in bringing more focus to this?</p> <p>We will address the issue in more depth at the next meeting.</p>

Ad 3 Collaborative projects, update of proposals, indication of possible project consortia

Current round of project calls is out, see:

<https://danishsoundcluster.dk/project-call-for-nye-lydprojekter-2/> .

Next meeting

The next meeting in the working group on “Future Sound Tech Solutions” will take place:

- **Wednesday May 10, 2023** **15:00 to 16:00**

Appendix 1: Participants in the meeting

Clément Laroche	GN Audio, Jabra	Senior Research Scientist
Efren Fernandez Grande	DTU, Department of Electrical & Photonics Engineering, Acoustic Technology	Associate professor
Jeremy Marozeau	DTU, Department of Health Tech. Hearing Systems Section	Associate professor
Jonas Raun Hansen	GN-Hearing	Manager, Electro Acoustics
Morten Kroman	WS Audiology	VP R&D Electronics
Tore Stegenborg-Andersen	FORCE Technology, SenseLab	Senior Researcher
Birger Schneider	CHAMAJ Consult ApS	Director
Shelley Livingstone	Danish Sound Cluster	Project Manager
Torben Vilsgaard	Danish Sound Cluster	CEO

Appendix 2: Events proposed and promoted by the working group

#	Title	Comments	Event type	Date
1.a	AI/Machine Learning	Workshop (Edge)	On-line	5 April, 2022
1.c	AI in signal processing		Webinar	
2	“Demant Discovery”	Start-up in dialogue with Demant	Networking event	17 March, 2022
4	Audio & privacy	Part of physical conference	Panel discussion	4 May, 2022
5	Sound Quality in Digital Meetings	<ul style="list-style-type: none"> • Position paper • Conference session 	Conference	4 May, 2022
6	Multisensory Processing		Webinar	7 December 2021
7	Sustainable transformation in Audio Companies	Green footprint in sound	Webinar	25 January, 2022
9	Personalization of User Needs		Webinar	1 June, 2022
10	Data Simulation for AI		Webinar	7 June, 2022
11	Perceptual Audio Evaluation		Webinar	13 October, 2021
12	Key Note, Sound Day 2021 “The Sound of Metal”	Oscar Winning Mikkel E.G: Nielsen, Film editor & Nicolas Becker, Sound Designer	Conference, Sound Day 2021	17 November, 2021
	AI in Audio Applications	Conference event at Digital Hi-Tech Summit, Bella Center	Conference	26 October, 2022
19	AI in Audio Applications		Webinar	13 December, 2022
8	Emerging Acoustic Sensor Technologies and Applications		Webinar	14 March, 2023
14	Feedback and noise cancellation		Webinar	9 May, 2023
17	Use of sound with robotics		Webinar	23 May, 2023

Appendix 3: List of potential Themes

Addressed or proposed in previous meetings' but for the time being put on the list of potential topics until the topics are better matured - or the need better identified.

#	Subject	Background
13	Hearables, OTC	<p>Theme is rather interesting.</p> <p>However, difficult to find speakers. Hearing aid companies are reluctant to contribute since the topic is too close to current business interests. It is not the products themselves but where and how such products are placed in the competitive landscape.</p> <p>University contribution is also not so likely since it is a topic mostly in the business domain.</p> <p>A discussion on what type of products is included under the term "hearables". The product term "hearables" was originally coined for a hybrid of the terms: wearable and headphone.</p> <ul style="list-style-type: none"> • OTC ("over the counter" products) belongs to the category of medical product, i.e. hearing aids. The WG feels that this is a separate domain, and does not fit into the general term "hearables" • Instead, most of the "hearables" seen to date are Bluetooth devices that use phones or PCs as the central computing unit. Focus seems to be on mobile communication, real time information services, activity tracking including biometric data, e.g. temperature, heart rate or oxygen saturation. <p>Although "hearables" is a business domain for many consumer technology manufacturers, several SME's and start-ups also have managed to obtain crowdfunding and soft funding from e.g. EU R&D funding, and are active in the area.</p>