

Speech and Hearing Group

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SpandH Research Topics

- Automatic Speech Processing
- Clinical Speech Technology
- Machine Hearing
- Speech and Hearing for Robotics
- Audio-visual Scene Processing

Automatic Speech Processing

What's it all about? Learning about speech signals from large amounts of data and using that knowledge to extract information from audio. We build systems that can,

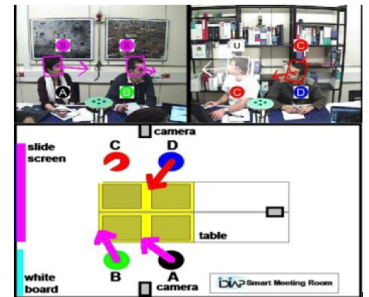
- recognise words in live or recorded audio (Automatic Speech Recognition)
- extract speech `meta-data' - speaker identity, emotional state etc
- act as an interface between audio and natural language processing systems

Why is this of interest to industry? Typical applications:

- Automated meeting transcription
- Speech search on mobile devices
- Speech-to-speech translation

Some example projects:

- with ITSLanguage - cloud-based language tutor (Hain)
- Documeet/EU project - meeting room transcription and summarisation (Hain)



Clinical Speech Technology

What's it all about? Using speech technology to help the elderly and people with impairments to live well for longer. We build systems that

- are tailored to the specific communication needs of individual
- can learn from small amounts of atypical data

Why is this of interest to industry? Typical applications:

- Speech recognisers tailored to disordered and atypical speech
- Robust voice-enabled environmental control for the elderly
- Post-laryngectomy “Silent Speech”-synthesisers

Some current projects:

- DiSArM with Practical Control Ltd, funded by NIHR i4i (Green, Moore)
- STAR with TherapyBox, NiHR i4i - speech therapy apps (Green)
- CloudCast with Leverhulme funding (Christensen, Green)



Machine Hearing

What's it all about? Machine systems that interpret sound in the same way that human listeners do. We build systems that:

- Separate sound mixtures
- Estimate attributes of sound (type, pitch, location, timbre...)
- Work robustly in the presence of unpredictable noise

Why is this of interest to industry? Typical applications:

- Screening large amounts of sound data, e.g. sonar arrays
- Extracting information from sound in domestic environments

Some current projects:

- KTP with Passion for Life Healthcare - diagnosis of obstructive sleep apnoea using smartphones (Brown)
- EPSRC with Phonak - development of audio-visual hearing aids (Barker)



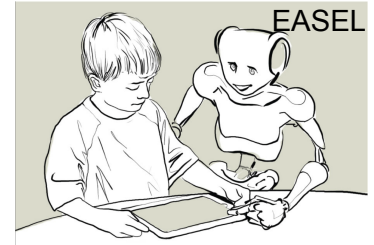
SpandH Robotics

What's it all about? Enabling Robotics with automatic speech processing and machine hearing technology. We build systems that

- interact with Humans using natural speech communication
- explore their acoustic environment using hearing

Some current projects:

- EASEL - EU project / expressive agents for education (Moore)
- MiRo - Biomimetic robot kit as a weekly publication (Moore)
- Two!Ears - Large EU project for Robot binaural hearing(Brown)



Audio-Visual Scene Understanding

What's it all about? Extracting meaning from live or recorded video. We build systems that,

- efficiently extract low level audio and visual features from video sequences
- build high-level representations that feed into video-based applications

Why is this of interest to industry? Typical applications:

- Natural language description of video for text-based querying (Gotoh)
- Video sequence similarity measurement for video-based querying
- Action recognition for video-based surveillance systems (Gotoh)

