

Binaural Hearing for Robots

Methodological Foundations

Binaural Hearing for Robots

1. Introduction to Robot Hearing
2. **Methodological Foundations**
3. Sound-Source Localization
4. Machine Learning and Binaural Hearing
5. Fusion of Audio and Vision

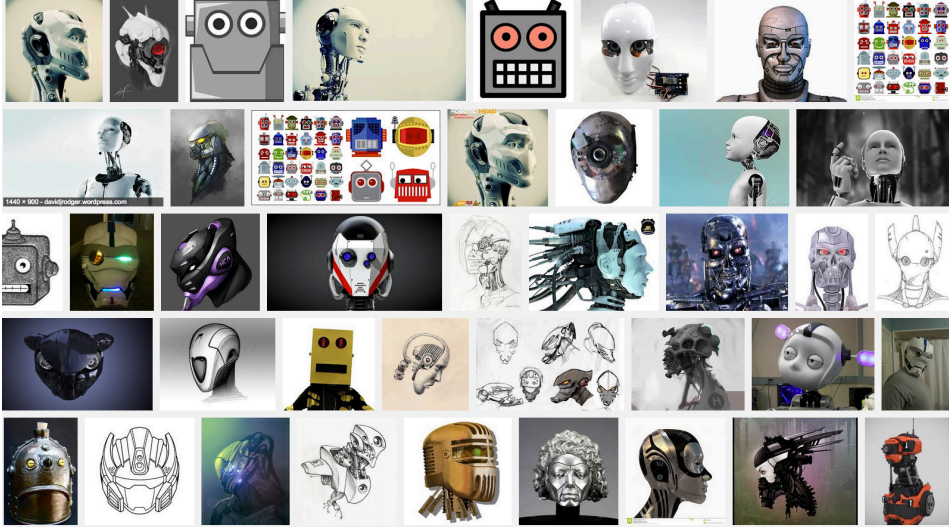
2. Methodological Foundations

1. Robot heads and acoustic laboratories
2. Binaural Processing Pipeline
3. Continuous-time Fourier transform
4. Continuous short-time Fourier transform
5. Discrete-time signals
6. Discrete short-time Fourier transform
7. Spectrogram of an acoustic signal
8. Cross-correlation
9. Relative transfer function
10. Binaural features

2. Methodological Foundations

1. **Robot heads and acoustic laboratories**
2. Binaural Processing Pipeline
3. Continuous-time Fourier transform
4. Continuous short-time Fourier transform
5. Discrete-time signals
6. Discrete short-time Fourier transform
7. Spectrogram of an acoustic signal
8. Cross-correlation
9. Relative transfer function
10. Binaural features

Robot Heads



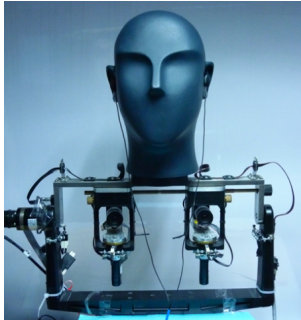
Acoustic Dummy Heads



Acoustic Head and Torso



Audio-Visual Robot Heads



Binaural & binocular heads mounted onto a pan-tilt device

Sound Sources



Sound sources: loudspeaker & people

An Acoustic Laboratory



Acoustic laboratory at Bar Ilan University

Anechoic Laboratories



Anechoic laboratories allow advanced acoustic experiments

Session Summary

- Robot heads
- Acoustic heads
- Acoustic laboratories
- Anechoic rooms