

Audio Processing and Indexing

E.M. Bakker

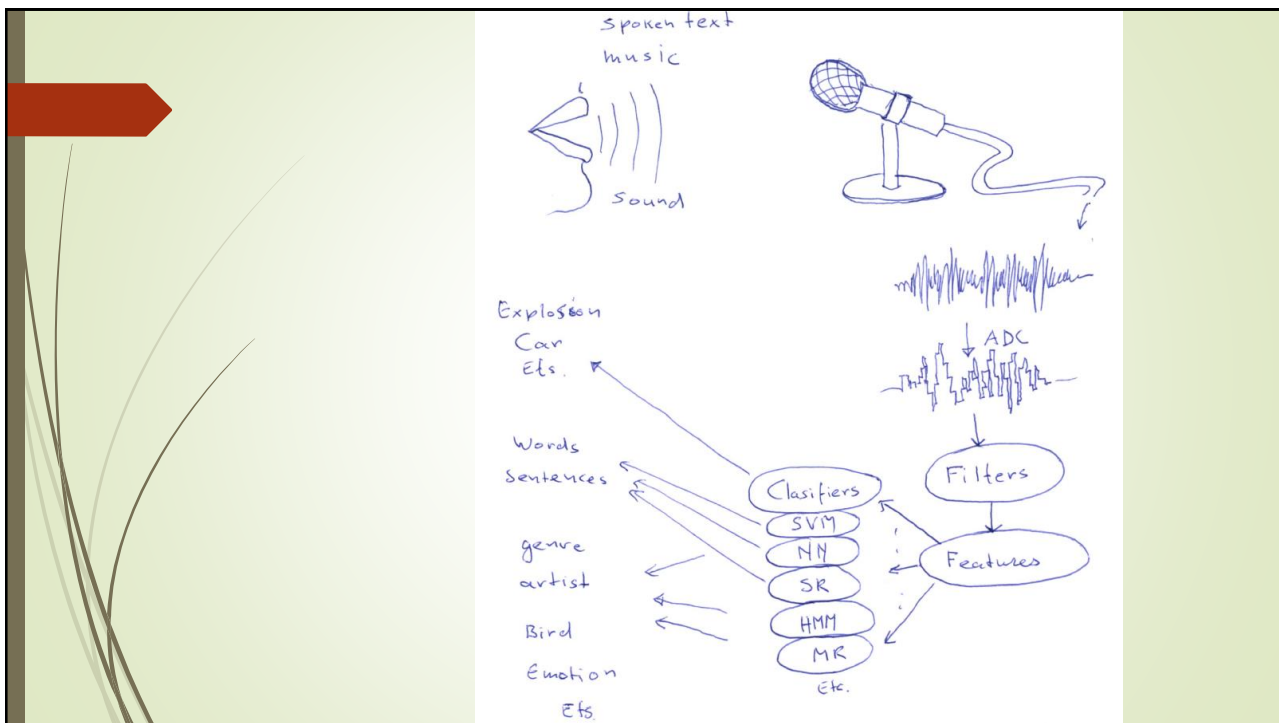
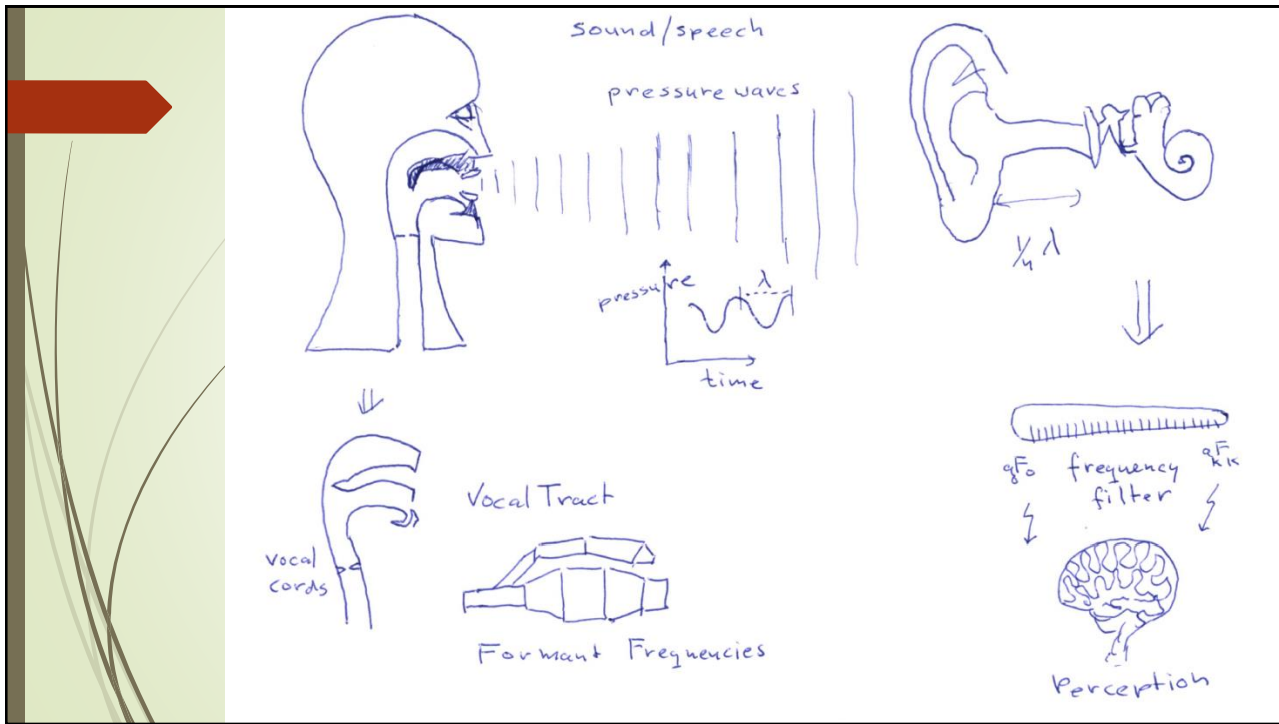
Overview

- 8-2 Organization and Introduction
- 15-2 Audio Production and Processing.
- 22-2 ADC and an Algebraic Introduction to FT
- 1-3 FFT
- 8-3 Project Proposals (presentations by students)
- 15-3 Audio Features and Data Sets
- 22-3 Audio Features workshop and data
- 29-3 Machine Learning + Workshop
- 5-4 Student Paper Presentations I.
- 12-4 Student Paper Presentations II.
- 19-4 Student Paper Presentations III.
- 26-4 Project Progress Reports
- 3-5 Team Meetings
- 10-5 Final Project Presentations Demo I
- 17-5 Final Project Presentations Demo II
- 23-5 Final Technical Project Paper (4-8 pages), code, and Web Site

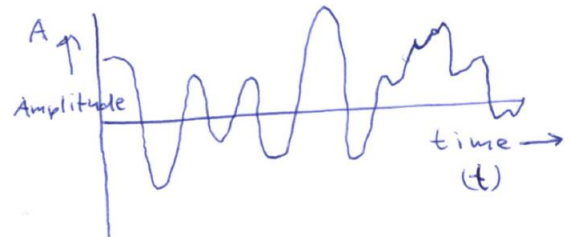
Grading (6 ECTS):

Presentations and Project (60% of grade).
Class discussions,
attendance, and workshops (40% of grade).

See: <http://liacs.leidenuniv.nl/~bakkerem2/api/>

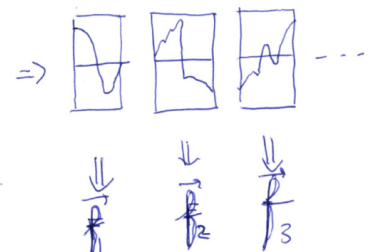
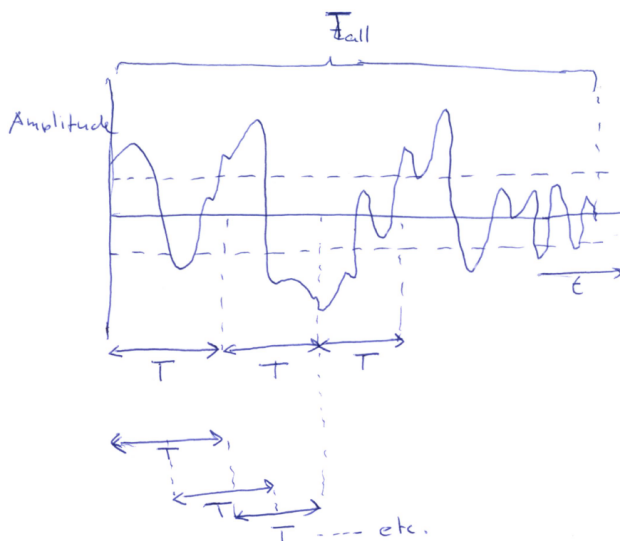
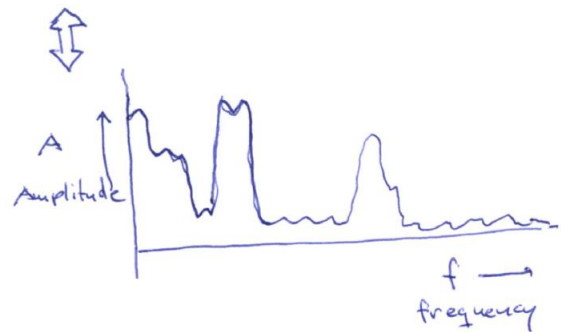


Digitizing Sound
Time Domain

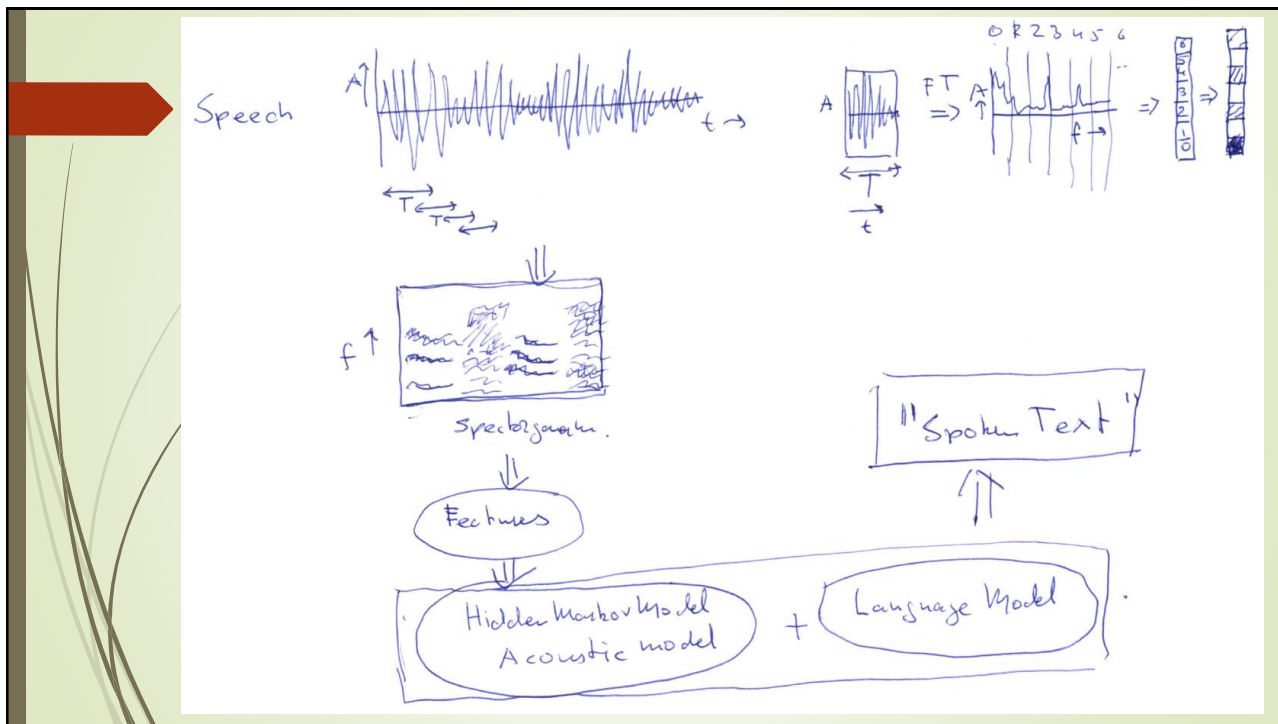


Fourier
Transform

Frequency
Domain



a series of feature vectors.



Applications

- ASR
- TTS
- Music Recognition
- Genre Recognition
- Sound Recognition
- Bird Recognition
- Sound location
- Language Recognition
- Timing
- Speaker Recognition
- Voice Cloning
- Singing
- Emotion Recognition
- Chord Recognition
- Music Transcription
- Cover Song Detection
- Drum Transcription
- Neural Audio Synthesis
- User Interfaces for Music Discovery
- Style Transfer
- Etc. Etc.



<https://dblp.org/db/conf/index.html>

- ISMIR <https://dblp.org/db/conf/ismir/index.html>
- Interspeech <https://dblp.org/search?q=interspeech>
- Eurasip <https://dblp.org/db/journals/ejasmp/index.html>



Previous Projects I

- Second Voice Generation
- Robustness of Musical Genre Identification
- Improved Mobile Song Recognition
- An iOS App using Bliss for Improved Communication through Text-To-Speech
- ScoreAid
- Emotion Recognition
- Instrument Detection
- Musical Instrument Recognizer (Annotation)
- Audio Feature Extraction with Deep Belief Networks
- Audio Morphing
- Audio Indexing the 1.000.000 song data set
- Chord Recognition
- Audio Phantom Materialization
- Harmonic Model Based Audio Transformations
- Content-Based Music Similarity, Visualization and Automatic Play-List Generation.
- Indexing and Predicting Bands from Unknown Songs
- Interpolation between Different Instruments
- Modular Synthesizer
- Hit Predictor
- Pitch Perfector
- Inter-Voice Morphing


Previous Projects II

- A Steglbiza implementation using traditional digital signal processing techniques: Steganography in music through tempo modulation
- Transfer Learning limited edition sounds (VGG16)
- Tempo Extraction From Electroencephalography Using a Single EEG Channel
- Monophonic Music Generation with LSTM Recurrent Neural Networks
- Blind speech signal separation from stereo sound input
- Gaussian Process Audio Model For Audio Textures Modelling And Synthesis

Previous Projects III

- A Deep Learning Approach to Instrument Detection and Chord Estimation via Frequency-based Feature Extraction
- Open-Air Acoustic Delay-line Memory using a Micro-controller
- Midioke
- Towards Real Time Audio Mosaicing
- Artist Recognition with Convolutional Recurrent Neural Networks
- Automatically Identifying and Fixing Single Channel Audio Defects in Stereo Audio
- Information transmission by multilevel pitched audio
- Midioke
- Event Detection using Wavelet Packets.
- Dynamic Play-list Generation.
- Automatic Song Remixer.
- Isolating Voices in Sacred Harp Singing.
- Voicecrack: A geolocation- and voice authentication-based password recovery mechanism.
- Song year prediction based on dynamic range values.
- Quotes to Characters.
- Arduino Peripheral Sound Imitation System.

Overview

- 
- 8-2 Organization and Introduction
 - 15-2 Audio Production and Processing.
 - 22-2 ADC and an Algebraic Introduction to FT
 - 1-3 FFT
 - 8-3 Project Proposals (presentations by students)
 - 15-3 Audio Features and Data Sets
 - 22-3 Audio Features workshop and data
 - 29-3 Machine Learning + Workshop
 - 5-4 Student Paper Presentations I.
 - 12-4 Student Paper Presentations II.
 - 19-4 Student Paper Presentations III.
 - 26-4 Project Progress Reports
 - 3-5 Team Meetings
 - 10-5 Final Project Presentations Demo I
 - 17-5 Final Project Presentations Demo II
 - 23-5 Final Technical Project Paper (4-8 pages), code, and Web Site

Grading (6 ECTS):

Presentations and Project (60% of grade).
Class discussions,
attendance, and workshops (40% of grade).

See: <http://liacs.leidenuniv.nl/~bakkerem2/api/> (See also for projects from 2021)