# sound of ai accelerator

mentor self-presentation

alexander lerch

## background
education

- **PhD, TU Berlin**      1994–2000
  - Software-Based Extraction of Objective Parameters from Music Performances
  - summa cum laude

- **Diplom-Ingenieur Electrical Engineering, TU Berlin**      2004–2008
  - concentration: telecommunications/signal processing, minors: communications and technical acoustics
  - summa cum laude

- (**Diplom-Tonmeister (Music Production), UdK Berlin**)      1996–2000
  - no degree

# background
professional

- **full-time**
    - *Assistant/Associate Professor, Georgia Institute of Technology*     2013–pres
    - *Co-Founder/Head of Research, zplane.development*     2000–2013

- **temporary**
    - *Visiting Professor, Central Conservatory of Music, China*     Summer 2023
    - *Visiting Professor, Shanghai Jiao Tong University, China*     Summer 2019
    - *Visiting Professor, ShanghaiTech University, China*     Summer 2018
    - *Post-Doc, University of Victoria, Canada*     2010

## research
### areas of interest

- **audio content analysis**
  - music/speech classification
  - musical instrument recognition
  - drum transcription
  - chord detection
  - auto tagging
  - …

- **audio processing**
  - source separation
  - audio effects
  - …

- **music performance analysis**
  - extraction of objective performance parameters
  - student assessment

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## methods
methods of interest

- **representation learning**
  - improved structure of embedded representations
  - transferring knowledge from other representations and tasks
  - enforcing the meaning of specific embedding dimensions
  - …

- **insufficient data** for training
  - semi- and self-supervised learning
  - reprogramming
  - …

- **objective system evaluation**
  - evaluation of controllable systems with correlated attributes
  - statistical models for comparison of properties
  - metrics for sound generation

scholar.google.com/citations?user=29dF3UIAAAAJ

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## zplane.development
overview

- founded in 2000
  - founders: Tim Flohrer, Martin Schwerdtfeger, Alexander Lerch

- high-quality (production quality) state-of-the-art algorithms for music analysis and processing
  - research collaboration with universities

- products
  - cross-platform SDKs (software developer kits)
  - some end-user products

www.zplane.de

# zplane.development
products

- technology provider to the music industry
- best known for algorithms time and pitch modification of music: *time stretching*, *pitch shifting*

| tempo manipulation | original | 🔊 | double tempo | 🔊 | mod. timing | 🔊 |
| pitch manipulation | original | 🔊 | rand. modified | 🔊 | harmonized | 🔊 |
| | original | 🔊 | minorized | 🔊 | | |

- technology licensed mainly for
  - Digital Audio Workstations (DAW)
  - DJ software
  - music production tools

KORG  MACKIE. SONY
Microsoft  steinberg
DOLBY AVID Guillemot
Ableton

zplane.development
audio technology

zplane

## zplane.development
historical background

- started with minimal resources
  - no start-up ecosystem/support
  - no investors, but a bank loan

- started with minimal business knowledge
  - three engineers
  - no insights into market beyond consumer view
  - no experience with marketing or customer relations

- started with limited software engineering knowledge
  - experience with implementation of algorithms
  - no experience with architectural design, maintenance, etc.
  - limited experience with performance optimization

# zplane.development
business model

- iteration 1
  - service provider for music software industry

- iteration 2
  - develop SDK and exclusively sell it

- iteration 3
  - sell non-exclusively
  - negotiate for visibility

- iteration 4
  - royalties-based b2b model

- iteration 4.5
  - add simple end-user products for visibility and evening out cash-flow

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# zplane.development
## take-aways

- do your thing
  - get all the advise you can get but make up your own mind
  - you decide but always be open to question decisions/processes
  - know when to listen to customers and when not

- don't believe...
  - ... your competitors' marketing — everyone cooks with water
  - ... your own marketing — it's ok not being a genius

- transparency where possible can build trust
  - explain decisions and problems to users
  - don't be afraid to share some technical details here and there

- IF you have long-term plans
  - minimize 3rd party dependencies (API calls, platforms, libraries,...)
  - don't over-engineer but spend a significant amount of time on automated tests
  - avoid concentrating critical knowledge in only one person without fallback strategy

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thank you!

## links

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mail: alexander.lerch@gatech.edu

book: www.AudioContentAnalysis.org

zplane.development: www.zplane.de

music informatics group: musicinformatics.gatech.edu

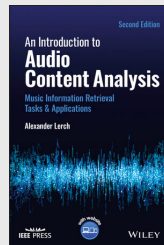github.com/alexanderlerch

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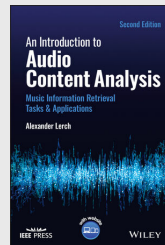
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Second Edition

An Introduction to
**Audio
Content Analysis**
Music Information Retrieval
Tasks & Applications

Alexander Lerch

IEEE PRESS          WILEY

github.com/alexanderlerch

✉

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