https://github.com/alexanderlerch/2025-slides-DAAD-Alumni-Confer

artificial intelligence and music

threats & opportunities

alexander lerch

Georgia Tech Center for Music Technology
College of Design

about

about me

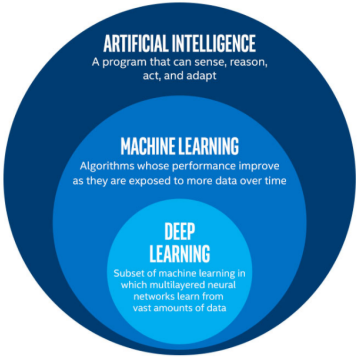
Georgia Tech Center for Music Technology
College of Design

- **education**
  - Electrical Engineering (Technical University Berlin)
  - Tonmeister (music production, University of Arts Berlin)
- **professional**
  - Associate Dean for Research & Creative Practice, College of Design, Georgia Tech
  - Associate Professor, School of Music, Georgia Tech
  - prev: 2000-2013: CEO at zplane.development
- **background**
  - machine learning for audio and music (20+ years)
  - audio algorithm design (20+ years)
  - commercial music software development (10+ years)
  - entrepreneurship (10+ years)

www.linkedin.com/in/lerch

introduction
artificial intelligence

- **artificial intelligence**
  - unclear definition: everything that is perceived to act intelligently
  - changes over time
- **machine learning**
  - data-driven: algorithm is more agnostic to task and is parametrized through training with data
- **deep learning**
  - deep neural networks are the ML approach used
- **generative AI**
  - deep neural networks *generating content*



machine learning
importance of data

machine learning: generic algorithm mapping an input to an output

- mapping function is learned from patterns and characteristics **from data**

⇒ model **success largely depends on training data**

- **technical challenges** concerning data
  - *imbalance & bias* (distribution is skewed, biased)
  - *diversity & representativeness*
  - *subjectivity* of annotations
  - *noisiness* (bad quality, bad annotations, . . .)
  - *amount*

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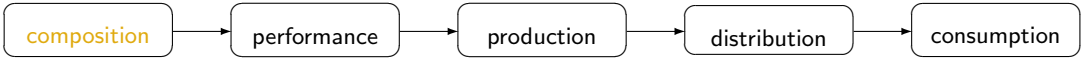
musical communication

chain of musical communication



- **creation of musical ideas** ("score")
  - defines style and idea
- **realization of musical ideas** into acoustical rendition
  - interpretation, modification, addition, and dismissal of score information
  - unique acoustic representation of score
- **recording, mixing, and editing** (in case of record media)
  - editing and splicing of recorded data; timbre, equalization choices
  - not separable from performance in a recording
- **distribution & listening**
  - music recommendation and discovery

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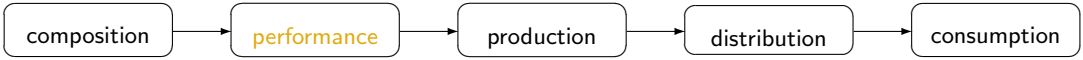

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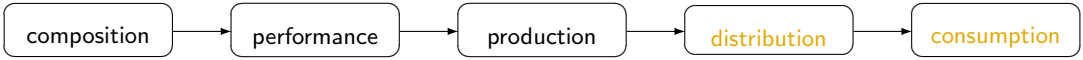

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musical communication and AI

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composition → performance → production → distribution → consumption

- **composition**
  - intelligent assistance, e.g., ideas, auto-arrangements
  - automatic composition
- **performance**
  - interactive music education systems
  - generation of 'human' performance
- **production**
  - auto-edit and auto-mix
- **distribution**
  - match music style and consumer
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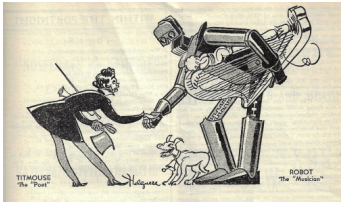

longstreet.typepad.com/thescienceblookstore/2017/06/the-invasion-of-musical-robots-1929

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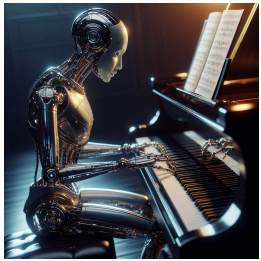

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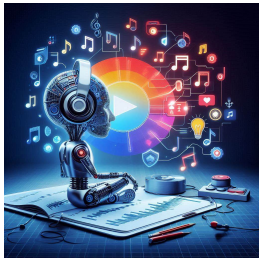

music ai
opportunities & threats

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opportunities

- content creation:
  - speed-up, increased efficiency
  - creative possibilities (morphing, etc.)
  - co-creative idea givers
  - democratization
- consumption:
  - personalization
  - effective discovery and accessibility

threats

- both:
  - 'mainstreamification'
  - bias through for-profit system control
  - sustainability and energy
- content creation:
  - ethical use of data
  - plagiarism growth
  - liability for harmful content
- consumption:
  - user distrust through
    - inflationary ai-generated content
    - inexplainable block-box systems

conclusion

- **paradigm shift has to be actively managed**
  - management and mitigation of impact on workforce
  - transparency and informing consumers
  - models for fair compensation
- **short-term**
  - opportunities for efficiency in content production
  - new tech will always be used in unforeseen creative ways
  - accessibility increases dramatically
- **fundamental questions worth asking**
  - when is a musical piece considered creative
  - what makes a human performance unique
  - can generated content be art

thank you!

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links

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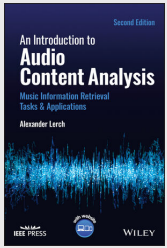
mail: alexander.lerch@gatech.edu

book: www.AudioContentAnalysis.org

music informatics group: musicinformatics.gatech.edu



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