



UiO : **University of Oslo**

Introduction to Multimodal Music Analysis

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The Research Council of Norway



Multimodal Data Analysis

Data interpretation
of various sources

Modalities in music:
audio, video, motion
capture data,
metadata, etc.

The Significance of Multimodal Analysis in Music Research

- Music exploration from various perspectives
- Uncovering of music connections
- Complete view of music



Benefits of Multimodal Music Analysis



ENRICHED
INTERPRETATION



CONTEXTUAL
EXPLORATION



INNOVATIVE
CREATIVITY



INTERACTIVE
EXPERIENCES

Real-World Applications



FILM SCORING



MUSIC EDUCATION



MUSIC PRODUCTION

Modalities Overview



Audio



Video



Motion Capture

Audio Data



Definition: music sound representation



Significance: deeper understanding of music structure



Video Data

- Definition: Music visual representation
- Significance: further musical context



Motion Capture Data

- Definition: capture of music gestures
- Significance: comprehension of music embodiment



Step-By-Step Workshop Plan - Audio Analysis



Digital Signal Visualization

Waveform

Spectrogram



Hearing our example



Feature Extraction

Dynamics

Rhythm

Timbre

Tonality





Step-By-Step Workshop Plan – Video Analysis

1. Watching our video example
2. Basic processing techniques
3. Motion Analysis
4. Visualization of analysis results

Step-By-Step Workshop Plan – Motion Capture Analysis



**Plotting the Motion Capture
Signal**



**Visualization of the Motion
Capture Figure**



Pre-Processing

Checking for missing values
Filling the gaps



Kinetic Analysis

Step-By-Step Workshop Plan – Putting it all together

1. Discussing Alignment Options and Issues
2. Synchronizing our plots
3. Rhythmic Analysis
4. AI implementation perspectives
5. ...and many more!




Motion Capture Analysis - Challenges

1. Alignment and Synchronization
2. Storage Issues
3. Filtering of Noise and Artifacts
4. Ethical Considerations



Conclusions

1. Multimodality as the future of Music Analysis
 2. Importance of audio, video, and motion for a holistic understanding of music
 3. Multimodal Music Analysis as a tool for music movement and emotion analysis
 4. Innovative applications in research, education, and industry
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Thank you!





