

# Explaining rehearsals of a symphony orchestra in virtual reality

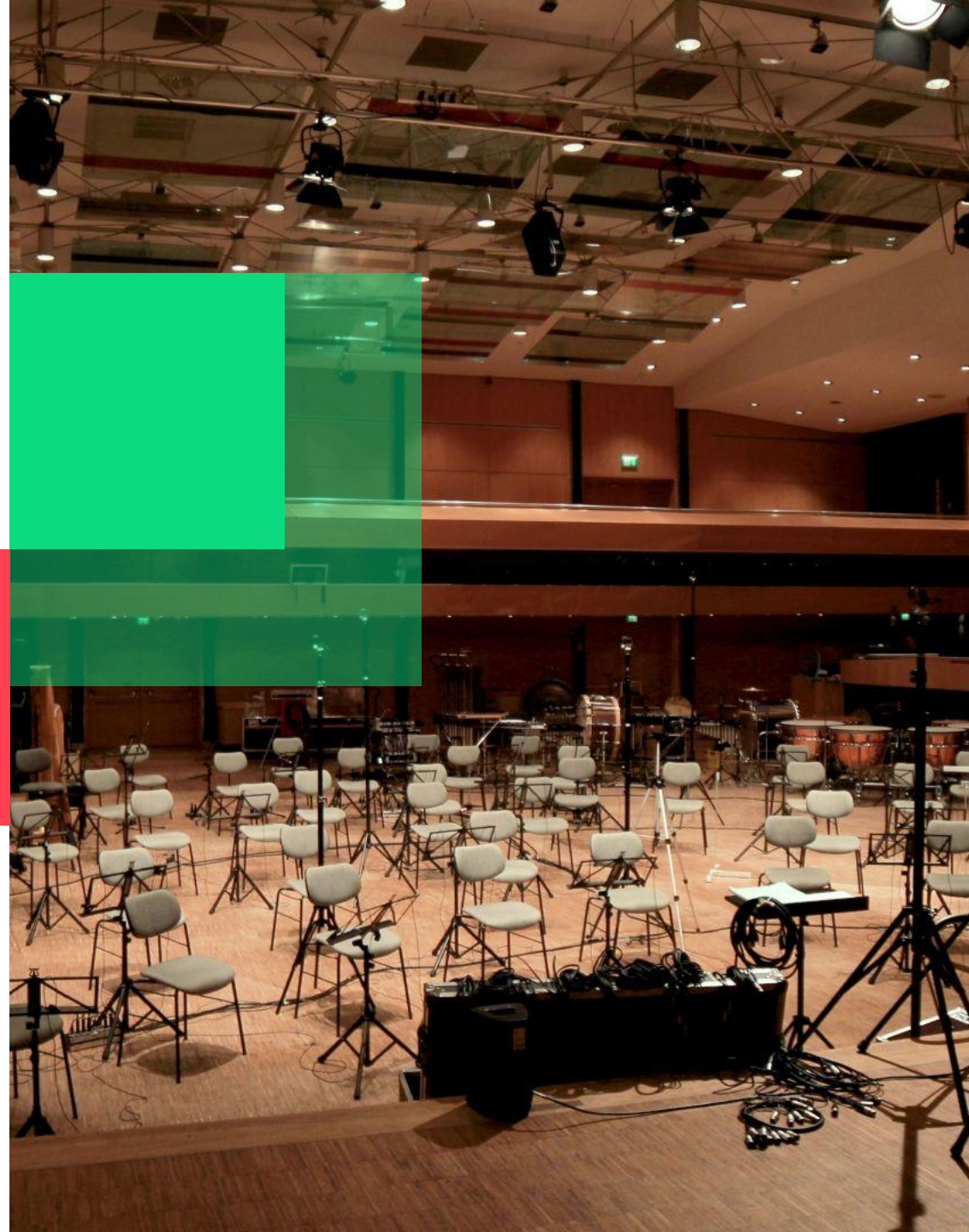
HCI International 2023 Workshop on Interactive Technologies for Analysing and Visualizing Musical Structure

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Hof University

23.07.2023



University of  
Applied Sciences



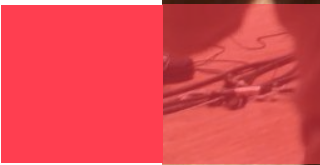
## How does a Symphony Orchestra work?

7 Instrument  
Groups (Violins,  
Brass, Drums, ...)

1 Conductor

56 Musicians

-> Explanation by  
experience!



## Necessary steps

Capturing motions

Capturing sound

Transfer to VR

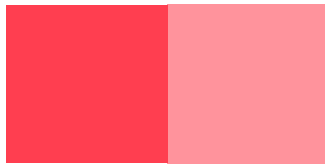
VR User Experience



## Capturing musicians motions

Machine learning  
based CMU's  
OpenPose Pose  
Estimation

Skeletons via  
Blender, Biovision  
Hierarchy (BVH) to  
Unity3D



## Scaling from one to many

8 GoPro Cameras

1 Camera per Instrument Group

Fixed seats

No occlusions



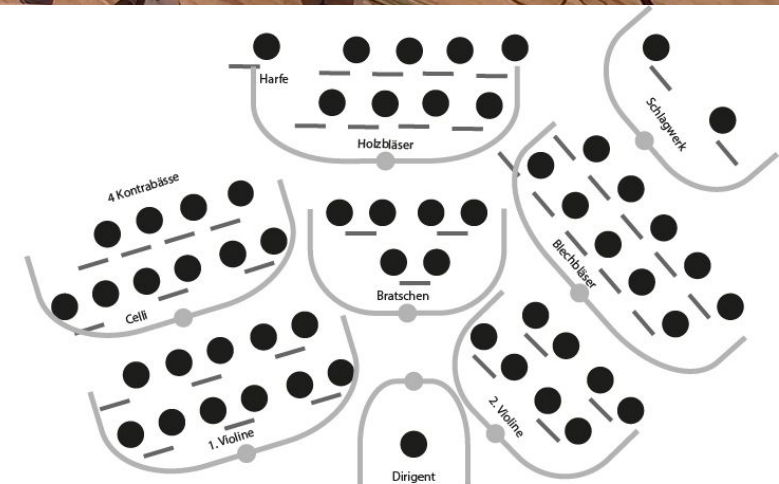
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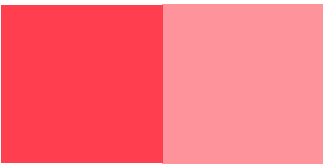
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— Notenständer  
● Kamera mit Aufnahmebereich



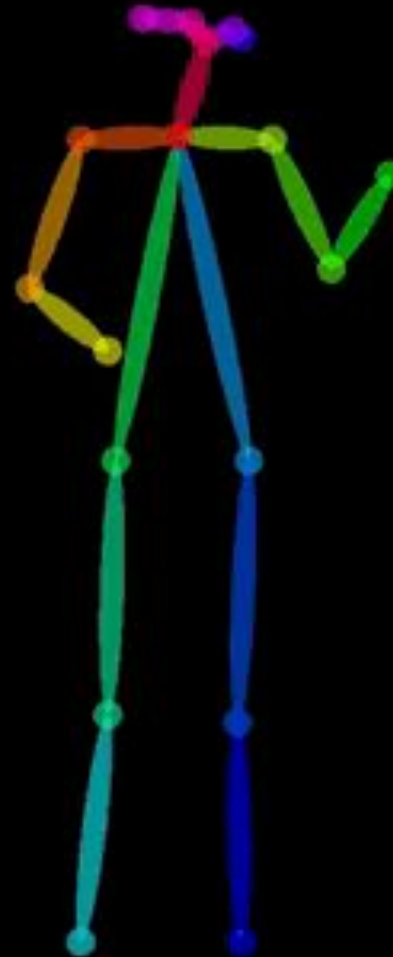
## Translating Skeletons to VR

Skeletons in  
BODY\_25 pose  
topology

Translating to  
Biovision Hierarchy  
(BVH) character  
animation file  
format (Python)

Rigging characters  
in Blender

Interactive VR in  
Unity

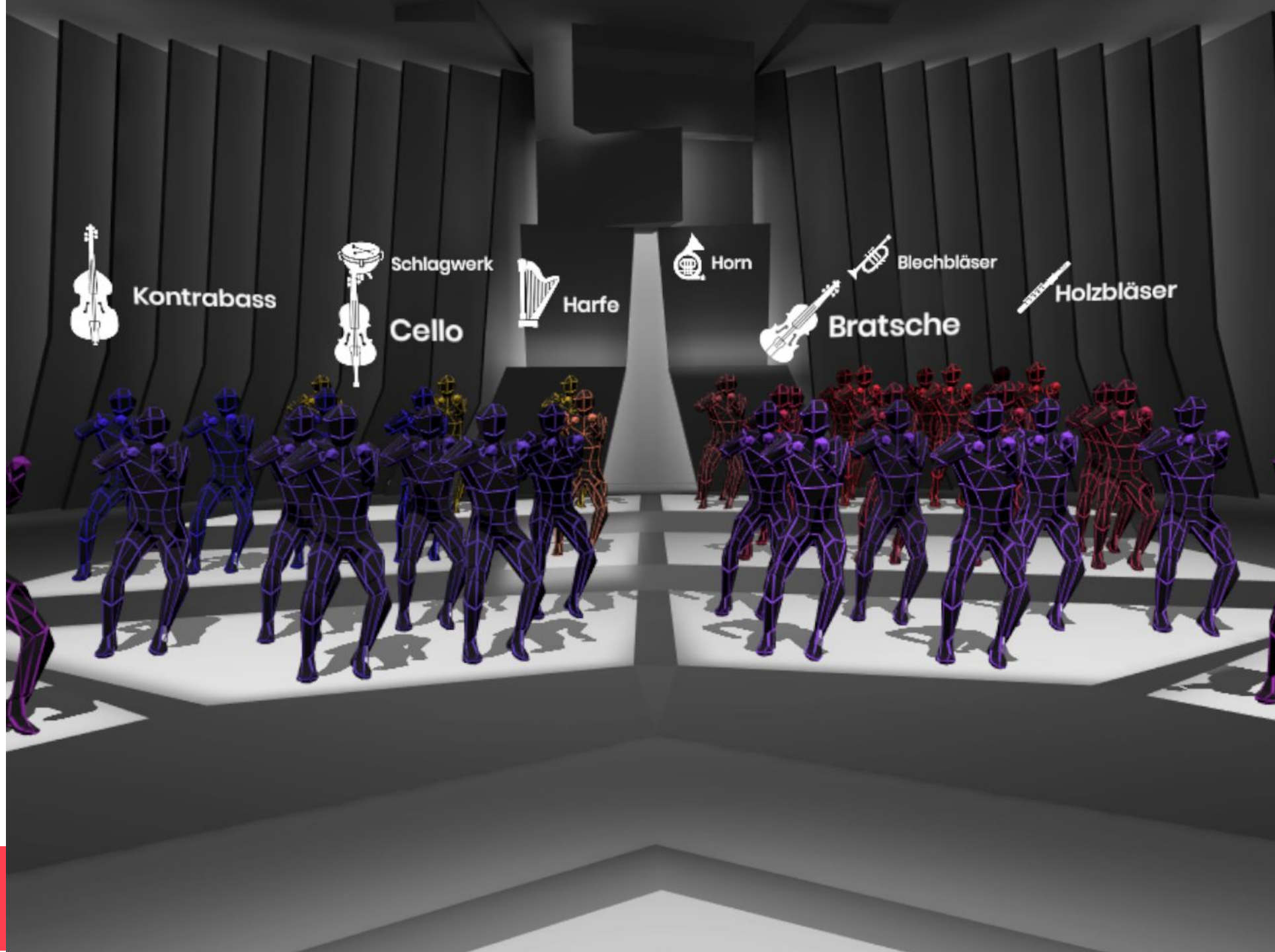


## Visualization

Abstract Tron-like characters

Color coding for instrument groups

Icons and typography for better recognition





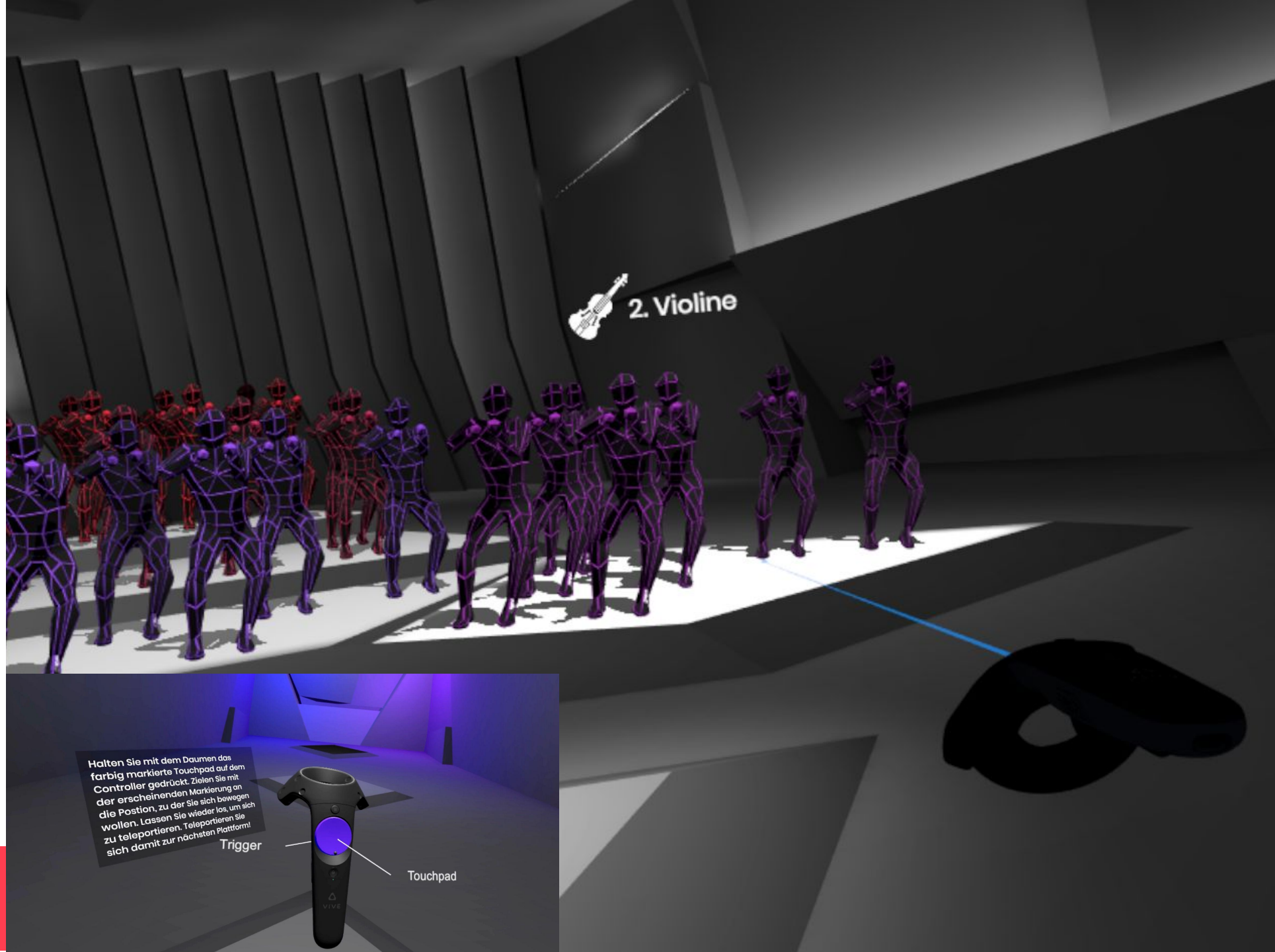
## Interaction

HTC Vive controllers

Start at conductor's position

Move around free:  
Experience views  
and spatial sound

Point and trigger to  
activate / deactivate  
musician groups



## Presentation

Hof Symphony  
Orchestra uses this  
tool for  
explanations

Graphics  
workstation with VR  
headset





## Our Team

Thanks!

<http://symotiv.de>

