Senior Human-Computer Interaction/Motion-Music Mapping Designer – Independent Contractor

Job Overview: Outlier Technology, LLC is seeking a Senior Human-Computer Interaction (**HCI**) Designer with a PhD or equivalent research expertise and a minimum of 5 years of industry experience building advanced, commercially viable, interactive, embodied motion or dance systems that connect human movement to musical expression in an intuitive and emotionally resonant way. This is a short-term, high-impact contract role, ideal for an accomplished expert who is interested in participating in the development of immersive neurotherapeutics at the intersection of music, AI, machine learning, healthcare, and neuroscience innovation.

Our current flagship project involves engineering data-driven, personalized, computer vision, machine learning, and music-based augmented reality neurotherapeutics for individuals with Alzheimer's disease. These tools aim to allow users to engage interactively with music creation in the context of individualized rehabilitation interventions that adapt to the user's musical tastes and clinical needs, to improve their cognitive and emotional wellbeing.

The ideal candidate will bring deep expertise in human movement modeling for applications in computer animation, robotics, and/or AR; extensive experience translating expressive human motion into computationally tractable representations for interactive movement or dance systems; and strong skills in computer vision, activity recognition, HCI, Python 3, OOP, and GitHub. Additional experience in physics-based motion simulation, generative models, reinforcement or imitation learning, and motion-capture or AI systems integrating kinematic/kinetic data is highly desirable. A demonstrated ability to build sophisticated, creative software systems and solve complex technical problems is essential. The contract work will be 1 man-month and can be distributed as part time work over 2 months. Work will focus on redesigning our current prototype for integration with immersive musical frameworks, computer vision, AI, and a central database system for evaluation of clinical efficacy in a pilot study and future commercial deployment. The position is fully remote, with regular Zoom meetings and collaboration with a highly interdisciplinary team. While U.S. citizenship is not a requirement, all remote work must be performed within the U.S. Compensation will be based on skills and experience. The target start date is on or before **January 1, 2026**.

Key Responsibilities:
- Co-Lead the collaborative design of a sophisticated motion-capture framework (e.g., using webcam or depth camera input) that identifies individual limb movements and translates them into musical parameters/structures
- Ensure the resulting motion-music mapping is physically intuitive, aligning movement qualities (e.g., energy, fluidity, tension) with corresponding emotional and musical qualities
- Design a user-centered interface that allows users and therapists to individualize motion - sound outcomes in meaningful ways and integrate personally significant nostalgic music and self-expression goals into the system.
- Develop comprehensive design blueprints, including architecture diagrams, wireframes, mock-ups, and implementation notes to guide an engineering team
- Work in close partnership with software developers, music technologists, computer vision experts, neuroscientists, and project leads to ensure cohesive design and implementation
- Design and implement evaluation protocols for motion capture fidelity, expressive freedom, emotional impact, and therapeutic relevance; refine models based on testing feedback

Required Expertise:
- Ph.D. or equivalent experience in Human-Computer Interaction, human movement modeling, or a related field
- 5-10 years of industry experience designing commercial, interactive systems for movement-based expression
- Expertise in motion capture, computer vision, or real-time body tracking (e.g., OpenPose, MediaPipe)
- Expertise in designing and training ML models (GANs, transformers, LSTMs, etc.) for motion simulation
- Proven track record of user-centered design and iterative prototyping
- High-level proficiency in object-oriented programming (e.g., Python, C++), and experience with ML/DSP libraries
- Proven ability to balance artistic sensibility with scientific rigor in commercial interactive motion systems
- Proven ability to efficiently deliver results within developmental timelines in research-driven environments

Preferred Qualifications:
- Experience building and deploying commercial or large-scale interactive musical movement systems
- Familiarity with frameworks for interactive media development (e.g. Max/MSP, Unity, or TouchDesigner)
- Deep understanding of rhythm, phrasing, arrangement, and structure across a wide range of dance styles
- Experience with affective computing, emotion-based interaction design, embodiment, and musical semantics

Outlier is an early-stage neuroscience innovation start-up and the recipient of Phase I & 2 SBIR funding from the National Institute of Aging and the 2023 & 2024 Catalyst Award from the National Academy of Medicine. Our present work explores the development of data-driven, immersive musical tools to improve cognitive health and emotional wellbeing in individuals with neurological conditions such as Alzheimer's disease. For more information on current opportunity postings visit https://outliertechnology.com/open-roles or email info@outliertechnology.com.