

Body as Instrument:
An Exploration of Gestural Interface Design

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Submitted to the Faculty of Arts and Social Sciences

in fulfilment of the requirements for the Degree of

Doctor of Philosophy

2016

Certificate of Original Authorship

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Mary Mainsbridge 2016

Acknowledgements

Principal supervisor: Dr Jon Drummond

Co-supervisor: Dr Andrew Johnston

Co-supervisor: Professor Anne Cranny-Francis

Editing: Dr Guenter A. Plum

I wish to thank my principal supervisor, Dr Jon Drummond, and co-supervisors, Dr Andrew Johnston and Professor Anne Cranny-Francis, for their ongoing guidance and encouragement. I would also like to thank my former supervisor, Dr Kirsty Beilharz, for coaching me in the initial part of my research.

To the musicians who took part in the study, thank-you for sharing your time and valuable input. Thank-you to Robbie Mudrazija for being part of the performances. To J D Young, thanks for offering live visuals, camera support and sound system provision for the Beams Arts Festival. Thank-you also to Melanie Russell for the photos of the *Bodyscapes* performances.

I'd like to thank Fiona Andreallo for sharing her ideas and inspiring me to keep 'turning up,' particularly during the final writing stages. I am also grateful to the students and researchers at Creativity and Cognition Studios, FASS and Sense-Aware Lab, for their feedback, advice and discussions,

Finally thank-you to my family for your endless patience and unwavering support.

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Abstract

Gestural interfaces broaden musicians' scope for physical expression and offer possibilities for creating more engaging and dynamic performances with digital technology. Increasing affordability and accessibility of motion-based sensing hardware has prompted a recent rise in the use of gestural interfaces and multimodal interfaces for musical performance. Despite this, few performers adopt these systems as their main instrument. The lack of widespread adoption outside academic and research contexts raises questions about the relevance and viability of existing systems.

This research identifies and addresses key challenges that musicians face when navigating technological developments in the field of gestural performance. Through a series of performances utilising a customised gestural system and an expert user case study, I have combined autoethnographic insights as a performer/designer with feedback from professional musicians to gain a deeper understanding of how musicians engage with gestural interfaces. Interviews and video recordings have been analysed within a phenomenological framework, resulting in a set of design criteria and strategies informed by creative practitioner perspectives.

This thesis argues that developing the sensorimotor skills of musicians is integral to enhancing the potential of current gestural systems. Refined proprioceptive skills and kinaesthetic awareness are particularly important when controlling non-tactile gestural interfaces, which lack the haptic feedback afforded by traditional acoustic instruments. However, approaches in the field of gestural system design for music tend to favour technical and functional imperatives over the development of the kinaesthetic sense.

Building on a growing body of gestural interface design and human–computer interaction (HCI) literature, this research offers practice-based insights that acknowledge the changing face of musicianship in response to interaction with gestural sensing technologies. To encourage enhanced physical aptitude and more nuanced movement control amongst musicians, I have applied embodied interaction design and dance-based perspectives to musical contexts, developing a multimodal environment that provides a range of design strategies for musicians to explore relationships between sound and movement while developing an awareness of their own movement potential.